PRECIS INDEXING

Development of a Working Model for a School Library Cataloguing/Information Retrieval Network

BRIAN BURNHAM AND AUDREY TAYLOR, Principal Investigators

This research was funded under contract by the Ministry of Education, Ontario. It reflects the views of the authors and not necessarily those of the Ministry.

Hon. Bette Stephenson, M.D., Minister
Harry K. Fisher, Deputy Minister

Ontario
Ministry of Education
Ministry of Colleges and Universities

PRECIS INDEXING

Development of a Working Model for a School Library Cataloguing/Information Retrieval Network

---

BRIAN BURNHAM AND AUDREY TAYLOR, Principal Investigators

This research was funded under contract by the Ministry of Education, Ontario. It reflects the views of the authors and not necessarily those of the Ministry.

© The Minister of Education, Ontario, 1982
Queen's Park
Toronto, Ontario

Canadian Cataloguing in Publication Data

Burnham, Brian, 1934-
PRECIS indexing

Co-published by: Ministry of Colleges and Universities.
ISBN 0-7743-7354-7

1. PRECIS (Indexing system). 2. School libraries --Ontario--Automation. 3. Library information networks--Ontario. I. Taylor, Audrey. II. Ontario. Ministry of Education. III. Ontario. Ministry of Colleges and Universities. IV. Title.

Z695.B9 025.4'82 82-093006-7

Additional copies may be ordered from:

Publications Sales
The Ontario Institute for Studies in Education
252 Bloor Street West
Toronto, Ontario
M5S 1V6

or from:

The Ontario Government Bookstore
880 Bay Street
Toronto, Ontario
M7A 1N8

(mail orders)
Publication Centre
880 Bay Street, 5th Floor
Toronto, Ontario
M7A 1N8

CONTENTS

Abstract (i)

How this report is organized (v)

SECTION I: Information needs in the "Information Society"

1.0 Introduction 1

2.0 Information science in the "Information Society" 1

3.0 Library cataloguing and catalogues today 2

4.0 PRECIS 4

5.0 Avoiding underuse of the potential of today's technology 5

SECTION II: The history of the "Aurora PRECIS Project"

1.0 Introduction /

2.0 Problems facing school library staff and users 7

3.0 Using the potential of today's technology 14

4.0 The Aurora PRECIS Project's results 16

SECTION III: Technical report

1.0 Introduction 23

2.0 Scope of research and development, 1978-80 24

SECTION IV: Appendices

Appendix A: Glossary 55

Appendix B: Bibliography 58

Appendix C: PRECIS mini-network 63

Appendix D: AUE Union Catalogue Supplement 64

Appendix E: Elementary school PRECIS subject index (print from Johnsview Village P.S. microfiche) 65

Appendix F: Aurora H.S. PRECIS subject index (print from microfiche) 67

Appendix G: Samples from an elementary school's microfiche catalogues 69

Appendix H: Samples from the Aurora H.S. microfiche catalogues 69

Abstract

Ease, efficiency, and speed in locating relevant information is highly and properly valued in today's "Information Society". Unfortunately, it is often anything but easy for students to find in their school libraries all the materials pertinent to their learning needs. Nor is it easy for teachers to discover just what materials are available in the school's learning resource centre that will support the instructional programs they must plan. The result has been underuse of school libraries. Why this situation has existed and what one school system has done to try to remedy this condition is the subject of this research and development project, which has spanned almost the whole decade of the 1970s.

In the 1960s, small classroom libraries expanded into large multimedia learning resource centres holding very diverse and complex curriculum support materials. Accompanying the curriculum revolution of those years was a proliferation of print materials and non-print items such as filmstrips, discs, tapes, and multimedia kits. Many librarians found that the traditional methods for descriptive cataloguing of such a variety of materials were inadequate. Existing subject indexing methods were not well suited to school libraries. Busy librarians often chose to buy commercial cataloguing services even though the products sometimes did little or nothing to help library users find what they wanted.

By 1971 three computerized systems to facilitate library automation had been developed: MARC (MAchine-Readable Cataloguing); COM (Computer Output Microform); and PRECIS (PREserved Context Index System). The objective of this York Region project was to determine whether, by linking together the power of these systems, many of the problems which resulted in underuse of school libraries could be solved.

The most difficult part of the job would be to develop a PRECIS subject data base for school library materials and to link it to the MARC bibliographic data base (basic cataloguing information). This would result in two linked data bases which could be shared by members of a cataloguing network. From the linked data bases could be generated, by computer, a "user-friendly" catalogue providing a comprehensive picture of precisely what is available in a library's collection. The easy-to-use, powerful catalogue could be produced in book form or in microform (COM) or, in the future, on the video display screen of a terminal or computer.

This project began in The York Region Board of Education at Aurora High School in 1972 with a test of PRECIS in the manual mode. Use of the computer systems began in 1976. When the feasibility of a computerized system for a high school was established (1978), the Aurora experience became the starting point for a school library cataloguing/information retrieval mini-network to include elementary as well as secondary schools. In 1979 the Ministry of Education funded work to determine whether automated cataloguing and PRECIS subject indexing could be successfully applied in elementary schools. By the end of 1980 this mini-network included one secondary school and four elementary schools. As well, two other elementary schools were in the process of being integrated into the mini-network. COM catalogues and other computer-generated technical products for all schools in the mini-network were being centrally generated (at Aurora High School) by a small team (2.1 professional staff, 1 library technician, 1 clerk). Experience with this mini-network was to determine the feasibility of developing a provincial network of school libraries.

Major positive findings to the end of 1980 are: (1) the model, or mini-network, is functioning and can be expanded; (2) the microfiche format chosen for the school library catalogues is fast and easy to use and is well accepted by student users, if not by all teachers; (3) the PRECIS subject indexing method gives the high degree of specificity desired by library users; (4) the use of the MARC bibliographic data resident in the computers of the University of Toronto Library Automation Systems (UTLAS), and accessed on-line, yields about 90 per cent of the desired bibliographic records for print materials and about 50 per cent for non-print items and thus represents a great saving in original cataloguing effort; (5) such original cataloguing as is being done by the project meets the standards of other users of UTLAS, as evidenced by their use of these cataloguing records.

Major negative findings to date are: (1) the original PRECIS computer program is heavily taxed when large volumes of data are processed (a new program is being developed); (2) unanticipated inadequacies in the MARC format for audiovisual products have been found; (3) a number of imperfections in computer products and in work flow have been found and steps taken to remedy them.

Tasks to be accomplished in order to establish a province-wide or national network are noted in this document, which only reports on work to the end of 1980. Where it seemed desirable to give later data, such have been inserted as footnotes.

How this report is organized

Readers of this, our second major report on this project, will no doubt possess various backgrounds and information needs. An attempt has been made to provide for such differences, essentially by segmenting the document and alerting the reader to the intentions and content of each section. This would permit skimming or even skipping.

Section I, "Information needs in the 'Information Society'", very briefly attempts to put this project into a historical context, provides a description of the purpose of PRECIS (PREserved Context Index System) in the light of recent needs and opportunities, notes the international range of PRECIS applications, and concludes by relating the foregoing to certain requirements of today's school libraries.

Section II, "The history of the 'Aurora PRECIS Project'", is a basically non-technical narrative description of problems associated with the catalogues normally used in school libraries and of how the three computerized systems used by the project are attempting to deal with these problems. Descriptions of accomplishments to date and of what needs to be done next are given.

Section III, "Technical report", is a minimally technical account of how the various objectives of the contract entered into with the Ontario Ministry of Education were met or (to some degree) missed. Occasionally it is necessary to provide quantitative and detailed information or to use the terminology of the professionals (a glossary is appended), but no attempt is made to peer into the "black boxes" and to explain what the computers are doing.

Section IV, "Appendices", consists of several parts, each intended to provide some detail in support of the first sections. The glossary has already been mentioned; even professional librarians may need to consult this sometimes, since the field is full of acronyms, new terms, and so on. Scholarly references in Sections I and III have been reduced to almost cryptic citations in the form "(author, date)". Hence this project's first major report, A computer-based catalogue linking the PRECIS subject indexing system to school library materials, by Burnham, McCordick, and Taylor, published in 1978, is referred to as "(Burnham, 1978)".[1] A bibliography with full citations helps to decode these efforts to keep the major sections free from scholarly clutter. The bibliography also includes works which serve as supportive authorities for most if not all opinions offered by the present writers. Among the appendices are samples from the microfiche catalogues produced for Aurora High School and for one of the elementary schools (for best viewing of these fiche, use a reader fitted with a 42x lens).

---

1. Report available for $.50 (on microfiche only). Order microfiche ON01036 from Publications Centre,
880 Bay Street, 5th Floor
Toronto, Ontario
M7A 1N8
Cheques should be payable to the Treasurer of Ontario.

SECTION I: Information needs in the "Information Society"

1.0 Introduction

In this section, some needs of school libraries are presented in the context of recent developments in information science.

2.0 Information science in the "Information Society"

2.1 The library world has long recognized the wastefulness of having thousands of cataloguers, in their separate libraries, writing bibliographic descriptions of identical items. It is infinitely more desirable to record bibliographic information in an authoritative form and then to share it. Such efforts have had increasing success through use of computer and communications technologies. Regional, national, and international automated bibliographic networks have resulted. School systems have been slow to recognize and to capitalize on these developments.

2.1.1 Certain needs of the "Information Society" -- fast, easy, and precise retrieval of information -- are now beginning to receive wide attention. The traditional subject heading systems used in library catalogues were designed to meet the needs of a different technical and sociocultural era. In Canada, these subject systems are based on printed authority lists: the Library of Congress Subject Headings (LCSH); Sears List of Subject Headings (widely used in schools); and the Canadian Subject Headings, created to supplement the American authorities. These systems were developed to draw together, in a catalogue, all the library's titles on one broad subject, e.g., China -- History. Under these circumstances, a high-school student, charged with writing an essay on the contrast

between life styles in China old and new, has considerable difficulty finding precisely the materials he or she needs among masses of titles pulled together under one or more broad subject entries. With the new subject system described later in this report, he or she is likely to find more helpful subject entries such as:

CHINA
Families. Structure

and,

CHINA
People's Republic of China. Agricultural communes

The old subject systems do not provide for such entries. Clearly, the newer systems, developed to use the computer's powers, permit a greater degree of specificity and comprehensiveness.

3.0 Library cataloguing and catalogues today

3.1 In 1965, the Library of Congress developed a format, known as MARC (MAchine-Readable Cataloguing), for the storage of bibliographic records on magnetic tape. The MARC format has been adopted by other countries, with local modifications. Once the data is stored in a computer data base, rapid movement of the information becomes possible between libraries, either by physical exchange of tapes or by on-line transmission from the computer to a terminal.

3.1.1 Large bibliographic data bases become the centres for networks. The cataloguing work is shared by the members, and the records are manipulated to produce individual library catalogues and other technical products. Large academic libraries and public library systems are presently the principal users of these networks.

The technologies available today provide superior alternatives to card catalogues. A printed book catalogue can be produced by the computer. But, as paper costs are high, the trend today is to use laser microphotography for computer-produced microfilm or microfiche catalogues. This will probably be but an interim step to on-line catalogues accessible by computer terminals.

3.2 Today, it is urgent that users of the library catalogue have a subject index more capable of responding to their information needs than the traditional subject headings. There are several reasons why the need is greater than in the past.

(a) Libraries now house information of a range and variety unimagined twenty years ago.

(b) An increasing number of the works in library collections are interdisciplinary. Each of these must be classified according to the discipline chiefly emphasized in its content and stored in one place on the shelf, but the document may also contain a significant amount of information related to other disciplines housed elsewhere in the library.

(c) Information is now stored in many forms other than print (film, audiotape, videodiscs, etc.). Without precise subject access, information so stored can only be assessed by a library client willing to use viewing or auditing equipment and to expend a considerable amount of time.

3.2.1 In North America, awareness of the need for better methods of subject analysis and indexing has developed slowly.

4.0 PRECIS

4.1 Britain moved ahead in the field of subject indexing when PRECIS (PREserved Context Index System) was developed for use with UK MARC records in the British National Bibliography's automated system. PRECIS, first used in 1971, became stable for the English language in 1974. Since then continuing research has added new codes and multilingual and translingual capabilities.

4.1.1 PRECIS is a set of working procedures which combines human intellectual effort in subject analysis and indexing with the data processing powers of the computer. The indexer is free to select terms and concepts found in the work being indexed. The subject statements, or strings, include a number of terms, each set in context with the others to describe precisely the content of the work. The indexer is also free to decide which terms in a string are to appear as lead terms and identifies these by a machine-readable code. Other codes, called role operators, set the terms in the string into a pattern prescribed by a grammar resembling that of natural language. A single form of the string, with codes, is input to a machine-held file and from it the computer produces a full set of index entries with the appropriate typography and associated punctuation.

Terms selected during the indexing process, and the codes which establish the selected terms' relationships to synonyms, higher generic terms, and other associated terms, are assigned to a second machine-held file. From this are produced the "See" and "See also" references in the computer-generated subject index catalogue.

In PRECIS, as in any indexing system, control of terminology is necessary to maintain consistency: An alphabetical list of all index entries and reference terms provides this control, as well as the base for construction of a full thesaurus (For examples of PRECIS index entries and references see Appendices E and F).

4.1.2 Following its initial use in Britain, PRECIS has had a number of innovative applications in Australia, France, Denmark, and Canada. Some of these international applications are described briefly in an earlier report by the project (Burnham, 1978).

In Canada, PRECIS has been applied in both English and French. The Ontario Education Resources Information Service (ONTERIS) uses PRECIS for both its printed indexes and its on-line service. The National Film Board of Canada (NFB) has PRECIS subject indexes in its film catalogues and plans on-line search capabilities for the information and distribution system that it is developing. The Aurora PRECIS Project uses PRECIS for its one-stage subject index microfiche catalogues. These catalogues have been produced for the five school libraries belonging to its mini-network.

5.0 Avoiding underuse of the potential of today's technology

5.1 One point needs to be kept in mind as school systems move into the automation of their library cataloguing. They should be aware of the danger of using the new computer technology merely to perform better the old routines. There is a need to analyze and to evaluate those routines and to consider using the excellent alternatives that are made possible by today's technology. The "obvious" worth

of "doing more", or "doing it faster", or "doing it cheaper" may all too easily obscure the fact that "it" may not be worth doing at all, given a superior alternative. For libraries, the advent of computer technology could result merely in "putting the old card catalogue on wheels", an inadequate solution to modern information needs.

There now exists an opportunity to assess and respond to the needs of the different consumers of information. In school libraries, the clientele (teachers as well as students) has specific information requirements which are poorly met by the present cataloguing system and catalogue format.

5.2 It is to these requirements that this project addresses itself. Today's technology and its products must be considered not merely as a supplement to the older methods but as a potent <u>alternative</u> capable of doing what was previously not possible or feasible. The PRECIS Project can make a major contribution to school librarianship. Such a contribution would be of great significance for the emerging "Information Society".

SECTION II: The history of the "Aurora PRECIS Project"

1.0 Introduction

This is a report of a developmental research project to investigate means of improving the quality of service in Ontario school resource centres. Users of these centres and other educational libraries need better tools for accessing information. Problems related to the design of library catalogues and increasing their effectiveness have been a main concern of the project.

The first part of this section (2.0 - 2.4) presents a summary of the problems. The next part (3.0 - 4.3.2) is a narrative, non-technical summary of what has been accomplished toward solving these problems by means of a working model of a school library cataloguing network with three salient features: (1) use of a national computerized cataloguing network; (2) computer generation of microfiche library catalogues and other products; (3) use of PRECIS, a new computer-assisted indexing system to produce the subject section of the library catalogue. The last part of this section (5.0) points out what else must be done before the prototype network now operating in York Region Board schools can be applied provincially in a cost-effective manner.

2.0 Problems facing school library staff and users

2.1 Once established, stocked, and staffed, school resource centres provide materials for curriculum support and also for the personal growth of students and the professional development of staff. However, many librarians and other educators believe that school library resources are seriously underused. Observational studies

tend to confirm this belief. Some underuse appears to result from various inadequacies in the library catalogue, which should help those seeking materials, but more commonly frustrates them.

Problems inherent in a school library catalogue relate to how it is produced, its physical format (almost invariably a card catalogue), and the traditional subject indexing systems.

2.2 Card catalogue production problems

Normally, resource centre catalogues are produced by the school librarian, purchased from commercial sources, or a combination of both.

2.2.1 In the first mode, the teacher-librarian performs the necessary intellectual tasks by examining each acquisition, consulting the cataloguing reference tools, and drafting the cards. This is followed by labor-intensive clerical tasks, such as the typing on 3" by 5" cards and filing of these cards by the librarian or assistant (if one is employed) or, often, by a student or parent volunteer. Time and energy are also required to generate labels for book spines, circulation cards, etc.

2.2.2 Catalogue card sets are also available from commercial vendors. Provided that funds are available, the librarian can purchase most of the cards, correct them or add supplementary data, and then direct the filing of the cards and so on. The subject index cards so supplied present problems because they use standard subject headings not designed with the school library user in mind, and do not include the "See" and "See also" references.

In addition to the visible costs of card sets, there are invisible costs associated with having the teacher-librarian perform technical and clerical tasks. Such tasks take time away from professional work with students and staff.

2.2.3 In some instances, a librarian is appointed well in advance of the opening of a new school (a year before in the case of a secondary school). Much of this lead-time is taken up with cataloguing or, alternatively, money is spent for commercial products. But even then an adequate catalogue may not exist when the school opens. (One of the authors of this report experienced an instance where a high school library was closed for the whole of the school's first year while cataloguing was being completed.) Since (in 1980) an Ontario school librarian could be earning up to $35,000 a year or even more, this is clearly an inefficient as well as an ineffective use of time and money.

2.2.4 Cataloguing production costs do have to be incurred. But, for each item, the intellectual work of cataloguing should not have to be performed more than once, after which the results can be stored in a computerized data base. These records can then be shared. Moreover, this data base can be used to produce, by automated means, catalogues and other technical products.

2.2.5 In spite of the availability of systems to do these tasks, efforts and costs are still being replicated in virtually every school library or central processing facility. Unfortunately, despite the labor and money expended on technical chores -- and the misuse of the professional teacher-librarian at a technical level -- the

resultant card catalogue is still largely an unsatisfactory product.[2]

2.3 The card catalogue: physical format problems

School libraries almost invariably use card catalogues. The physical format of the card, housed as it is in catalogue drawers, leads to a number of unsatisfactory conditions for both library staff and library users.

2.3.1 For the teacher-librarian, the sorting and filing of cards involves much time. Hence these tasks are often left to untrained volunteers who, through lack of knowledge of filing rules and human fallibility, commit errors which detract from the catalogue's usefulness. Similarly, the card catalogue is seldom up to date. The cards relating to lost or withdrawn materials are seldom removed from the catalogue because this requires time and effort. It is also very time-consuming and hence costly to retrieve cards and revise them in order to update terminology and subject headings. For example, when a nation takes a new name (Zimbabwe for Rhodesia), or a new term replaces an old one (Inuit for Eskimo), the terminology is seldom revised in school library card catalogues.

2.3.2 The student user encounters problems with the physical format of the card. Only one card can be consulted at a time. In addition,

---

2. A few Canadian school boards have centralized cataloguing and technical services and are beginning to automate. This may reduce but not eliminate some of the problems noted. The teacher-librarian is spared certain chores, of course, when they are handled centrally. However, these few systems still face the problem of "subject access" since their data base still uses the same inadequate standard list of subject headings.

as students say, "you need long nails" to persevere in a card catalogue search. If others are waiting for a card drawer because there is only one card catalogue, some users may terminate their search prematurely. Other users, after consulting only one or two cards, incorrectly assume that all related materials will be found at the same location on the shelves. This is not so. School libraries normally use the Dewey Decimal Classification system which, like any classification scheme, distributes related materials to different locations. Hence the user may overlook pertinent materials.

2.3.3 As a school library user, the teacher also faces problems. First, the teacher finds it very arduous (if not impossible) to use the card catalogue to identify all that is available to support program units in any given subject area. Part of the problem is the necessity of scanning card by card, an awkward and time-consuming exercise. Part of the problem is the need to repeat the process through each subject section which might yield leads. Hence a teacher may make a cursory check of the cards, or scan the shelves, or merely hope for the best when suggesting that students may find needed support materials in the library. Sometimes the teacher merely passes on the task by asking the librarian either to prepare a bibliography or to pull from the shelves all materials on the topic.

2.3.4 There is normally only one card catalogue for each library. This may present a problem to users who can go to that catalogue only when the library is open and then perhaps must wait for access to it. There is an even greater difficulty in knowing what materials

are in other libraries, since card catalogues cannot be exchanged or union c talogues easily compiled. The sharing of collections, which is highly desirable, especially when money is scarce, is thus inhibited. The building of shareable, specialized collections of, for example, expensive reference books or audiovisual materials is also hampered under these circumstances.

2.3.5 As a physical facility, the card catalogue may also be a problem for the library. As the collection grows, so does the size of the catalogue. In time, more card cabinets must be bought and these must compete with the resource materials for floor space. This could become a problem where there is no possibility of expanding the library's floor space.

2.4 Subject indexing problems

2.4.1 One problem that the teacher-as-library-user faces stems from difficulties in determining the subject content of the resource centre's holdings. In order to make a useful recommendation for additions to the library collection (to ensure that it holds materials to support the ever-changing curriculum), the teacher ought to be able to discover quickly and easily which subject areas are well covered and which areas require additional materials. But that is out of the question since the conventional subject index distributes related materials among unrelated subject-entry terms.

2.4.2 The teacher-librarian is also concerned with collection building and, when deciding what to add, depends on several sources of information -- including users' requests, book reviews, and personal knowledge of the collection and of curriculum requirements. The

librarian cannot rely on the card catalogue as a tool for spotting weaknesses in the collection, not just because of the time required to do a search or the physical difficulty of carrying it out, but because the catalogue has inadequate subject information. (Librarians will understand that the same is true of their "Shelf List" cards which are filed in Dewey order.)

2.4.3 Thus, while a catalogue's subject index ought to be useful in discovering what materials are available to support any curriculum area, the subject index section does not respond well to the needs of school library staff and users. Subject indexing in Canada traditionally uses either the printed list of Library of Congress Subject Headings (not designed for school libraries) or the Sears List of Subject Headings (a variant of the Library of Congress system) and the Canadian Subject Headings. Because of the following deficiencies, none of these versions is satisfactory for school use:

a) lack of current terminology and of a feasible way to update between revisions of the lists;

b) lack of specificity and comprehensiveness in the subject entries;

c) lack of suitable terminology (as terms are not intentionally curriculum-related, school librarians tend to add nonstandard headings);

d) use of inverted word order and form divisions in many subject headings leads to ambiguity;

e) lack of sufficient access points (each subject heading provides only one point of entry into the subject catalogue - up to three subject headings may be assigned to one title);

f) lack of reference structure (the "See" and "See also" aids) when, for example, cards are bought from commercial suppliers or when teacher-librarians are too busy to make such structures.[3]

2.4.4 Summary

So unsatisfactory is the card catalogue that, more often than not, school library users bypass it and go directly to the teacher-librarian who is expected to be a walking, talking catalogue. Alternatively, the librarian is seen as someone with the magic skill and endurance to search through the catalogue for the user. Librarians know that this is a wasteful, ineffective, and frustrating use of their talents and time and that it inhibits the growth of students' independent learning skills.

3.0 Using the potential of today's technology

3.1 For over a decade, three computerized systems have existed which can help solve the problems noted above. These systems are the central features of the model school library network this project has been building.

3.2 The first system, called MARC (MAchine-Readable Cataloguing), is the heart of national computerized cataloguing networks and can

---

3. Commercially-produced sets of reference cards are now available. Also, Library of Congress Subject Headings are being automated and include reference authorities. How adequately these solve some of the school library's problems has not yet been demonstrated.

eliminate repetitious cataloguing. This system provides a computerized data base whereby a network of users can share a pool of cataloguing information. The intellectual work done by one is available to all. Once the cataloguing information is in the computer, catalogues and technical products (e.g., spine labels) can be produced in the format appropriate to the library.

3.3 The second system, called COM (Computer Output Microform), provides an alternative to the card format. This system displays cataloguing information covering dozens of items on one easy-to-scan "page". These "pages" can be produced on microfilm or microfiche. Because it is easy to use and cheap, the latter is well suited to schools. At a 42 reduction factor, each 4" x 6" microfiche (more commonly called "fiche") can hold more than 200 normal 8 1/2" x 11" pages; thus fiche catalogues consume relatively little space. The author catalogue for a collection of 8,500 titles could fit on one fiche (see the Aurora High School author catalogue in Appendix H). Copies of fiche catalogues are inexpensive and as many can be produced as circumstances require.

3.4 The third system, called PRECIS (PREserved Context Index System), is a subject indexing method which overcomes most of the problems of locating needed information. The PRECIS method ensures that:

a) terminology is current, and previously used terms can be easily updated;

b) subject entries are specific and can be comprehensive;

c) terminology is derived from the materials, not from printed lists, and is therefore curriculum-related when drawn from school library materials;

d) subject entries are in "natural" word order, avoiding ambiguity;

e) as many access points as are called for by the materials and the curriculum can be generated by this indexing system (each PRECIS "string" provides a number of points of entry; multiple strings can be assigned to one title);

f) a reference structure is an integral part of the system.

3.5 These three systems are, as noted, computerized, but it is not the intent of this document to describe how the computers and their software work.

4.0 The Aurora PRECIS Project's results

4.1 1972-75

Between 1972 and 1975, Audrey Taylor, Aurora High School librarian, demonstrated that a PRECIS subject index (at that time prepared manually and produced in card format) significantly improved the finding of wanted materials and won the ready acceptance of users.

4.1.2 Funds were sought to automate the PRECIS indexing, as its British designers had intended, and to utilize the MARC system to reduce other cataloguing tasks. By using both systems, catalogues could be produced in other formats, i.e., book or microfiche (COM). The PRECIS computer program and the MARC records were already resident at the University of Toronto Library Automation Systems (UTLAS). Through UTLAS, book or COM catalogues could be produced by computer. Thus, it looked as though only professional and technical support staff and a computer terminal were needed to achieve automated cataloguing. The assumption proved to be naive.

4.2 1976-78

In 1976-78, the Ministry of Education funded the first two-year stage of the project, the aim of which was to develop for Aurora High School COM microfiche catalogues, enhanced by PRECIS, using MARC records.

4.2.1 By 1978, it was clear that the three systems did resolve most of the traditional problems and produce a superior product that was much more useful than the card catalogue. For instance, cataloguing information was found in the computer data base at UTLAS for about 90 per cent of books and 50 per cent of non-print materials for Aurora High School (only minor editing of some cataloguing data was required).

4.2.2 The easy-to-scan microfiche catalogues were readily accepted by Aurora High School students, who found that the PRECIS subject index catalogue gave them a much clearer picture of the resources available to them. Moreover, they could now see at a glance the different shelf locations of materials relevant to their search.

In addition, through using the PRECIS subject index's "See" and "See also" structures, some students began to comprehend the hierarchical structure of phenomena. Superordinate entities are related to their subordinate constituents. For example, a student searching on "Rodents" might be directed in a PRECIS subject index to "See also Mice, Rats". Effective searching was further facilitated by the one-to-one relationship of terms, unique to PRECIS subject entries, which readily enabled users to see how to expand or narrow the scope of their search.

4.2.3 Some teachers began to use the catalogue in planning their course assignments. From the beginning it was expected that microfiche catalogues and readers would find their way into the school staff-room and into department offices. If good portable readers could be found, there was no reason why the fiche couldn't go home with teachers who wanted to do program planning there. (In fact, when the fiche catalogues were first regularly used outside the Aurora High School library, it was in the school's technical wing. The automotive teacher reported that not only did his own students use the catalogue, but other students also dropped by to browse.)

4.2.4 However, at the end of 1978, the following technical problems and intellectual challenges still existed:

(a) the PRECIS computer program needed updating and upgrading;
(b) complex non-print materials required time-consuming cataloguing;
(c) the indexing of literature, particularly novels, needed rethinking.

There was also the challenge of determining whether the PRECIS indexing method used for secondary school materials could be successfully applied to elementary school library collections.

4.2.5 To respond to these challenges, the Ministry of Education and The York Region Board jointly funded work in 1979 and 1980. The objective was to process the collections of these newly constructed elementary schools and to create a model school library network.

4.3 1979-80

As this stage of development drew to a close, its successes and shortfalls could be reckoned and future activities specified. A mini-network that includes Aurora High School and four elementary schools has come into being and is generally functioning well.

4.3.1 Successes include the following:

(a) The computerized cataloguing network provides cataloguing information for over 90 per cent of English language book materials for both elementary and secondary schools. Since original cataloguing is required for only one book in ten, and since only minor editing is needed for the remainder, this constitutes a great saving in terms of intellectual effort and time.

(b) The computerized cataloguing network provides cataloguing information for 50 per cent of non-print materials for both secondary and elementary schools. Since cataloguing such materials is especially difficult and time-consuming, so much so that it often is not even done, this represents a very substantial benefit.

(c) Not only does the original cataloguing done exclusively by the Aurora PRECIS Project staff meet the needs of all five schools presently in the York Region mini-network, but statistics provided by UTLAS show that other users of the national cataloguing network, with whom we have a sharing agreement, are using the MARC format records produced by the Aurora project.

(d) Aurora High School and four elementary schools have received COM catalogues. These have been well received in all instances. They are easy to scan and make it possible to "browse" the catalogue instead of the shelves.

(e) The microfiche catalogues have been produced in multiple copies (at costs of $1.00 to $2.00 for each additional copy after the original). Hence any reasonable number of students and teachers can be provided with this searching tool for use at locations other than the library (e.g., in departmental offices, home, staffroom). Copies of these easily portable fiche have been shared among the mini-network members to facilitate inter-library loan and collection building.

(f) The computer-generated catalogues have freed the librarians from sorting and filing of cards and catalogue maintenance.

(g) For the four schools (Aurora High School and three elementary schools) which have now had updated fiche catalogues, revision of terminology and correction of errors have been easily accomplished, because of the power of the computer.

(h) In the libraries of Aurora High School and the new elementary schools costly and space-consuming card cabinets have not been required. A microfiche reader and the fiche catalogues can be easily situated wherever there is a 30" by 30" flat surface.

(i) The PRECIS subject index has made it markedly easier for users to discover what materials are available on a topic because of the following advantages of PRECIS: specificity and exhaustivness of the subject entries; curriculum orientation and currency of terminology; and, because of the special one-stage format of the catalogue designed by the PRECIS Project, all materials on a given subject are pulled together for easy scanning.

(j) The PRECIS method has been used with print and non-print materials representing all major curriculum areas. As of December 1980 there were 13,300 titles, 18,014 PRECIS "strings" and 12,200 reference terms in the PRECIS Project files in the UTLAS data base. The subject data is available for use by York Region schools and could be shared by authorized network participants across the country.

4.3.2 Several problems were identified and not resolved by December 1980.

(a) There were difficulties with work flow and materials management in the centralized technical services facility at Aurora High School.

(b) More time than anticipated was required for the physical processing of the materials (e.g., sorting computer products, putting on labels, book cards and pockets, plastic jackets, etc.) in the elementary schools.

(c) There were inadequacies in some computer-generated products (e.g., labels).

(d) The MARC format was inadequate for some audiovisual materials.

(e) There was slow acceptance of the microfiche catalogues by many teaching staff. (However, they do not use card catalogues either.)

(f) The lack of a sufficiently large file of bibliographic records enhanced by PRECIS discouraged existing school libraries from joining the mini-network.

(g) The limits of the original PRECIS software were such that UTLAS was not prepared to support major new users (other school boards, etc.).

(h) The cost (staff, computer time, etc.) has inhibited school boards from automating and centralizing school library technical services. The participation of other school boards is required in order to move the PRECIS Project from its status as an experimental working model to the intended provincial cataloguing/information retrieval network. Moreover, networking pays its way when many users share the cost of producing the cataloguing/indexing data.

4.3.3 Actions suggested to resolve these problems are as follows:

(a) Work flow and materials management methods should be evaluated and the need for more staff and hardware be examined.

(b) In order to meet the materials handling needs of the elementary school librarians, the effect of providing an itinerant school aide should be studied. (This processing problem arose because the elementary schools were new and acquiring up to $25,000 of materials in one year.)

(c) Assessment of some of the technical products and recommendations for change to UTLAS should be continued.

(d) Recommendations for changes in and additions to the MARC format for audiovisual materials should be made.

(e) A training program for teachers that will help them to recognize the strengths of the microfiche catalogues related to the needs of students should be developed with the emphasis on basic research skills.

(f) The means of rapidly increasing the size of the bibliographic files enhanced by PRECIS should be explored in order to expand the central file of PRECIS data available to school users.

(g) The implementation of the new PRECIS software should be expedited.

(h) Librarians and school administrators should be encouraged to understand the implications of networking and the need for automated centralized technical services for school libraries.

Such actions are presently being undertaken or considered by the project staff or others involved.

SECTION III: Technical report

1.0 Introduction

In 1972 Aurora High School opened. The library materials had been catalogued conventionally, on cards, except that a PRECIS subject index had replaced the traditional Sears subject headings. By 1976, a research design had been developed to establish the Aurora High School library as the centre for automated cataloguing. The design addressed a number of concerns or objectives.

(a) There was a need to find out if the UTLAS bibliographic network could provide a high percentage of the cataloguing data required for the Aurora High School library materials.

(b) There was a need to demonstrate that a school library could wrestle successfully with the challenge of automated cataloguing and produce standard MARC cataloguing data acceptable to all users of a national bibliographic network.

(c) It was important to automate the PRECIS method for subject analysis and indexing in order to provide more complete subject access, including a full thesaurus, and to evaluate user reaction.

(d) It was necessary to test the linking of the computer-held files of bibliographic data to the PRECIS files in order to produce one-stage subject catalogues.

(e) There was a need to test the book and COM (Computer Output Microform) forms of the author, title, and subject catalogues with student users.

The results were reported to the Ministry of Education, which had funded this work, in October 1978 (Burnham, 1978).

1.1 Continuing research was necessary in order to develop a working model of a cataloguing/information retrieval network to include both elementary and secondary school libraries. This model could serve as the nucleus of an Ontario-wide system.

This technical report presents the activities and findings of the second research project (September 1978 to December 1980) funded jointly by the Ministry of Education and The York Region Board of Education.

2.0 Scope of research and development, 1978-80

The focus of the research has been on the following areas:

(a) building the elementary school bibliographic file;

(b) providing microfiche catalogues for the three new elementary schools;

(c) establishing a working model to test networking;

(d) testing the use of PRECIS for indexing elementary school materials.

UTLAS recommended a separate union file structure for the elementary school bibliographic data. The PRECIS data base contains the indexing information for both elementary and secondary school materials. The data base continues to expand as a central source of PRECIS data for potential use by a larger school library network. The new model includes the secondary school bibliographic file, the elementary school union file of bibliographic data, and the shared PRECIS files.

The objectives of the research contract entered into with the Ministry of Education are stated (in capital letters) sequentially in Subsections 2.1 through 2.15 below. Following each objective is a status report discussing attainments or shortfalls.

2.1 CATALOGUE, INDEX WITH PRECIS, AND ENTER INTO THE DATA BASE AT UTLAS (UNIVERSITY OF TORONTO LIBRARY AUTOMATION SYSTEMS) A MINIMUM OF 1,000 NON-FICTION PRINT AND NON-PRINT TITLES OF THE AURORA HIGH SCHOOL RESOURCE CENTRE COLLECTION.

2.1.1 This objective has been attained beyond the minimum requirement. Approximately 1,700 new non-fiction titles have been completed and added to the secondary school bibliographic file. Two hundred and sixty-five new non-print items have been completely processed. While these figures might seem modest, more time was given to the development of the new elementary school union file.[4]

2.1.2 The figures that follow show the growth in the secondary school bibliographic file since September 1978:

	Sept. 78	Dec. 80
Total number of bibliographic records	5,076	7,850

While there has been some growth in the size of the secondary school bibliographic file, only two thirds of the collection of the Aurora High School resource centre has been completed.

---

4. The contract covers the processing of materials for Aurora High School and three new elementary schools, Holland Landing Public School, Johnsview Village Public School, and Glen Cedar Public School. As the result of a fire in its library, Regency Acres Public School joined the mini-network for the processing of replacements of fire-damaged materials and new acquisitions. Two additional elementary schools are now being integrated into the mini-network: see Appendix C.

2.2 **CATALOGUE, INDEX WITH PRECIS, AND ENTER INTO THE DATA BASE AT UTLAS A REPRESENTATIVE SAMPLE (ABOUT 1,000) OF THE NON-FICTION PRINT AND NON-PRINT COLLECTIONS AT HOLLAND LANDING PUBLIC SCHOOL.**

This objective has been attained beyond the minimum requirement. Since May 1979, approximately 1,500 new non-fiction titles and 260 non-print items have been added to the elementary school union file for Holland Landing Public School.

2.2.2 The cataloguing of the non-fiction materials presented few problems. Approximately 90 per cent of the titles were derived from the UTLAS bibliographic data base. As the UK MARC records did not become available until January 1981, the majority of British titles required original cataloguing. The same situation applied to the French materials, for which only 20 per cent of the cataloguing was derived.

2.2.3 The cataloguing of the non-print materials proved to be a time-consuming and challenging task. These materials are intrinsically very different from books. The MARC format, originally designed for books, is still inadequate for some non-print materials.

Because of the cataloguing difficulties, many institutions have not processed this kind of material for their computer files. Consequently, there is a paucity of cataloguing records for non-print items in the UTLAS network (with the exception of 16mm films). As well, the access keys normally used for searching bibliographic files, the ISBN (International Standard Book Number), and the LC (Library of Congress) card number are seldom used for non-print materials. These numbers have not been assigned either by the

publishers or the Library of Congress. Searching is restricted to the precise title, a lengthy and inexact procedure.

Approximately 50 per cent of the 400 non-print titles for the elementary schools were derived. A file-sharing agreement with the National Film Board of Canada increased the "hit rate" for Canadian filmstrips and multimedia kits. Some titles were located in the source files of the Library of Congress, the National Library of Canada and our secondary school file. The remaining 50 per cent required original cataloguing.

Multimedia kits are particularly awkward to handle. Not only are the individual items a cataloguer's nightmare, but also the kits are difficult to store in the library. A decision was made by the teacher-librarians to break up the contents of the kits. The individual items would be catalogued and stored either on the shelves with the appropriate books or on hanging files in a separate area of the library. In the title section of the COM catalogues, the series title (followed by the list of titles of the individual items), was used to pull together the contents of a kit. The series titles did not print however, due to an omission in the catalogue specifications. The omission is being rectified.

2.2.4 It should be noted, however, that the indexing of audiovisual materials, using PRECIS, presented no problems. This came as no surprise, as it reflected similar findings documented in the Inner London Education Authority's Learning Materials Recording Study (Alcock, 1979).

2.3 CATALOGUE AND INDEX WITH PRECIS A REPRESENTATIVE SAMPLE (ABOUT 1,000) OF THE FICTION COLLECTIONS AT AURORA HIGH SCHOOL AND HOLLAND LANDING PUBLIC SCHOOL.

2.3.1 This objective has been attained beyond the minimum requirement. Approximately 2,300 fiction titles have been processed, including several hundred French books. It should be understood that the use of the term "fiction" is based on the definition given in Thrall's A Handbook to Literature: "narrative writing drawn from the imagination of the author rather than from history or fact". This interpretation includes novels, short stories, "easy reading" stories, picture books, drama, narrative poetry, fairy tales, and folklore.

2.3.2 A more complete analysis of some of the difficulties encountered in attaining this objective is presented in Subsections 2.7 and 2.11.

2.4 PROVIDE CATALOGUES (AUTHOR, TITLE, PRECIS SUBJECT INDEX) ON MICROFICHE FOR AURORA HIGH SCHOOL AND HOLLAND LANDING PUBLIC SCHOOL TO INCORPORATE THE MATERIALS REFERRED TO IN SUBSECTIONS 2.1 to 2.3

2.4.1 This objective has been attained. Samples from microfiche catalogues are appended for one elementary school and Aurora High School (Appendices G and H).

2.4.2 Two new sets of microfiche catalogues (author, title, and subject) have been produced for the Aurora High School resource centre since October 1978.

	Oct. 78	Nov. 79	Nov. 80
Total number of bibliographic records	5,076	6,020	7,420

On both occasions, receipt of the catalogue was delayed because of difficulties experienced at UTLAS with the PRECIS program. The software, developed for the College Bibliocentre, dates from 1973 when the algorithms written for the British Library program were rewritten for the Sigma 6 computer at UTLAS. The PRECIS data base has now grown to such a size that the program breaks down at some of the stages of selection and formatting. When this occurs, the program does not allow a restart at the point of breakdown. Production must return to the beginning and valuable time is lost. The new PRECIS software is being written specifically for integration with UTLAS CATSS (Catalogue Support System) and will overcome these problems (See also Subsection 2.8).

2.4.3 Three microfiche catalogues (author, title, and subject) have been produced for Holland Landing Public School resource centre:

	May 79	Feb. 80	Nov. 80
Total number of bibliographic records	1,148	1,996	2,865

2.5 PROVIDE CATALOGUES (AUTHOR, TITLE, PRECIS SUBJECT INDEX) ON MICROFICHE FOR JOHNSVIEW VILLAGE PUBLIC SCHOOL BY DERIVING, WHEREVER POSSIBLE, BOTH THE CATALOGUING RECORDS AND PRECIS SUBJECT DATA FROM AURORA HIGH SCHOOL AND HOLLAND LANDING PUBLIC SCHOOL DATA BASES.

2.5.1 This objective has been attained.

2.5.2 Three microfiche catalogues (author, title, and subject) have been produced for Johnsview Village Public School resource centre:

	May 79	Feb. 80	Nov. 80
Total number of bibliographic records	1,106	1,979	2,998

2.5.3 The deriving of records for Johnsview Village Public School did not proceed as originally intended. Because of the high degree of duplication of materials ordered for both Holland Landing and Johnsview Village, the decision was made to control and match the two collections off-line, thus saving computer time and costs.

A manual control card file was established in order to keep track of the holdings and the computer RSN (Record Sequence Number) for each title. If a new elementary school title matches an existing record in the elementary school union file, it is a simple matter to access that record on-line by the RSN and add the new holdings information. If the new title matches a record in the secondary school file, the record can be derived very quickly by the RSN and transfered to the elementary school union file.

2.6 PROVIDE CATALOGUES (AUTHOR, TITLE, PRECIS SUBJECT INDEX) ON MICROFICHE FOR GLEN CEDAR PUBLIC SCHOOL BY DERIVING, WHEREVER POSSIBLE, BOTH CATALOGUING RECORDS AND PRECIS SUBJECT DATA FROM THE AURORA HIGH SCHOOL AND THE UNION FILE FOR ELEMENTARY SCHOOLS (HOLLAND LANDING PUBLIC SCHOOL AND JOHNSVIEW VILLAGE PUBLIC SCHOOL).

2.6.1 This objective has been attained.

2.6.2 Two microfiche catalogues (author, title, and subject) have been produced for Glen Cedar Public School resource centre:

	Feb. 80	Nov. 80
Total number of bibliographic records	1,203	2,460

2.6.3 The total number of bibliographic records in the elementary school union file in November 1980 was 5,746. The total number of titles in the most recent catalogues (including the 500 titles for Regency Acres) was 8,823. Thus there have been 3,077 duplications. This would represent a duplication rate of 53.5 per cent of the titles if there were only one duplication per catalogued item. Sometimes a title was held by the four schools.

Cataloguing and indexing costs have been obviated for the "duplicate copies" regardless of how many schools hold the same item. Savings are a function of the duplication rate. Until the data base is of a very considerable size, the degree to which one school's acquisitions match the materials already processed cannot be expected to approximate 100 per cent.

2.6.4 The duplicate use of PRECIS strings for the Glen Cedar materials has not been recorded. The indexing team is aware of a comparatively high duplication rate (approximately 60 per cent). In many instances, the indexing of a given title is performed at the same time for all schools holding the title.

The content of the PRECIS files has increased significantly since the addition of the elementary schools.

Status of the PRECIS files:	Sept. 78	Dec. 80
(i) PRECIS strings in SINfile	6,575	18,014
(ii) Reference terms in RINfile	5,736	12,200

2.7 **WORK COOPERATIVELY WITH THE BRITISH LIBRARY BIBLIOGRAPHIC SERVICES DIVISION (DEREK AUSTIN) TO SOLVE INDEXING PROBLEMS IN APPLYING THE PRECIS METHOD FOR (A) A NEW TYPE OF USER (ELEMENTARY AND SECONDARY STUDENTS) AND (B) MATERIALS NEVER BEFORE INDEXED FROM THE SCHOOLS' PERSPECTIVE (E.G., FICTION, LITERATURE).**

2.7.1 Derek Austin, designer of the PRECIS method, and Jutta Sørensen, then of the Royal School of Librarianship, Copenhagen, Denmark, and consultant to the British Library multilingual/translingual projects, keep in touch with this project through correspondence. In August 1979, they met and conferred with the project team during their teaching of the British Library PRECIS course in Canada that summer.

Sørensen received permission from the Ministry of Education and The York Region Board of Education to copy and distribute the project's report of October 1978 to public and school libraries in Denmark. It was a pleasure to be able to repay in this fashion the valuable assistance she has so generously given.

2.7.2 Austin recognized the necessity for a different approach to the indexing of literature consistent with the needs of a student population. The string formats, designed originally for the British National Bibliography, were directed at the public librarian using the Bibliography as a selection tool, e.g.,

CHILDREN'S STORIES IN ENGLISH
1900 - -- Texts

The new formats developed by Carol Wiltshire, a PRECIS indexer with this project, and Audrey Taylor, project director, have been approved by Austin. He is considering the addition of the new formats to the British Library PRECIS course as examples of an

alternative method for the indexing of literature. Readers who are interested in this area should consult the subject catalogues (Appendices G and H) checking under such entries as "ENGLISH LITERATURE" and "CANADIAN CHILDREN'S LITERATURE". The reader will notice that the books have been indexed not only for form but also for themes.

2.7.3 The PRECIS string formats developed for literary themes differ for the elementary and secondary school materials. The two formats are an attempt to respond to the different levels of understanding of the student populations and to the demands of the curricula. For example, "love" as a theme in poetry is handled as follows:

(a) Secondary school string

LOVE
Themes of poetry -- Anthologies

(b) Elementary school string

LOVE
-- Poems

The use of two formats needs to be kept under review to determine whether this differentiation is necessary or useful.

2.7.4 In library literature there had been little interest expressed in the indexing of novels. Traditionally, some of the fiction genres have been grouped under such subject headings as, "Mystery and detective stories", "Short stories", "Adventure stories", "Science fiction", etc. These headings are broad and often leave the cataloguer in a dilemma as to which one to apply to a given title. The library user faces a staggering number of titles to sort through in order to make a selection.

The first PRECIS subject index in Aurora High School used PRECIS for the indexing of novels as well as non-fiction titles. The fiction section of the card catalogue was housed separately and proved to be extremely popular with the students. Such indexing was a response to frequent requests made to school librarians: "Can you help me find a story about ------?".

Several years ago, Annelise Mark Pejtersen, of the Royal School of Librarianship, Copenhagen, Denmark, began publishing on the indexing of fiction. Pejtersen was familiar with PRECIS and its ability to index both with specificity and exhaustivity the subject content of a book. She developed a theory for determining the "aboutness" of a novel based on user needs and interests as seen from the public librarian's point of view. Her criteria include "subject matter, frame, author's intention/attitude and accessibility" (Pejtersen, 1979).

The criteria developed for the Aurora PRECIS Project are based on student interests/requests and curricula. They include locale, the main plot, major character(s), action, themes, and genre. We believe the type of judgment required for Pejtersen's "author's intention/attitude" and "accessibility" to be beyond the scope of this research project.

Sørensen has advised us in correspondence that she, in cooperation with a teacher of literature, is giving a course at the Royal School of Librarianship that requires the students to make a <u>one-stage</u> PRECIS subject index catalogue for 600 novels. She describes the task as being "full of surprises and discoveries". We await her findings with interest.

2.7.5 It is evident that interest in and concern about the indexing of fiction is beginning to surface. Questions arising from the intellectual problems of indexing literature require more research. Mary Dykstra, School of Library Service, Dalhousie University,[5] whose doctoral thesis concerns the linguistic logic of PRECIS, has been helpful with the formulation of strings. Mr. Erle Kahnert, Master Teacher of English, The York Region Board of Education, and Mr. Peter Billingsley, Language Centre, Toronto Board of Education, have contributed their ideas about indexing for the concrete and the metaphysical aspects of literature.

2.7.6 The indexing of literature at the primary level has been particularly challenging, as very little work has been done in this area. The special study, reported in Section 2.11, was contracted to provide indexing guidelines for elementary and secondary school materials where there appeared to be a major divergence in approach, content, and terminology. The primary "easy reading" books and the picture books constituted one area of concern. These materials had to be indexed to respond both to the needs of the classroom teacher and to the interests of the pupil. Sørensen agreed with the prototype strings which had been developed at the time of the meeting in August 1979. Austin had some reservations about the coding of some strings, challenging the linguistic logic behind the coding.

The levels of language facility expressed in the learning theories of Piaget, Chomsky, and Chaffe have affected the formats of some of the elementary strings. For example, normal ellipses used in

---

5. Now at the National Film Board.

indexing language have been filled in with appropriate prepositions:

CARTOONS
About cats rather than CARTOONS
Cats

The approach here is to try this format and then to evaluate its effectiveness.

The PRECIS indexers have also explored ways of expressing some concepts that are difficult to capture with conventional indexing terms. For example, the concept

BEING BAD
Learning to be good

cannot be captured by the indexing term "badness".

Good subject access to children's literature has been a felt need in the teaching profession for a long time. Librarians have found that teachers require materials not only for specific curriculum topics but also for particular applications. For example, picture books which illustrate a child coping with fear of the dark are commonly requested. The traditional subject heading systems do not provide this kind of subject information. The librarian of Glen Cedar Public School was able to show a teacher who requested materials on "family conflicts" the range of titles available by searching the microfiche subject catalogue under the various uses of the terms

Interpersonal relationships

and

FAMILIES
Interpersonal conflicts

The teacher retrieved the needed materials in minutes.

2.7.7 Upward-reading references are never used in a printed index because such a practice would increase an index's size enormously. Austin concurred with the need to include upward-reading references in the case of finite aggregates and instances (e.g., North American Indians). Students need to be taught to check the broader term when using a narrow term for a search. For example, a student should learn that when looking for information about "Rats", he or she might find useful materials indexed under the term "Rodents".

2.7.8 One of the most significant contributions made by this research project to the international use of PRECIS has been the development of the first computer-produced one-stage PRECIS subject index catalogue. PRECIS was designed originally to be used for a back-of-the-book index to the classified catalogues of the British National Bibliography. Not only are North Americans unfamiliar with classified catalogues, but such a format was considered totally unsuitable for a student population. The first one-stage subject catalogue was designed by Audrey Taylor and Irene McCordick for Aurora High School, initially for a book catalogue, and later for the microfiche catalogues. The same format has been used for the elementary school microfiche catalogues (Appendices E and F).

The one-stage format has been implemented recently by the British Education Index, part of the British Library, and is under consideration for use in the British National Bibliography. The National Film Board of Canada will implement a variation of the one-stage format for its 1981 catalogues.[6] Sørensen's students are using the format for their catalogue of 600 novels.

---

6. Now published as PRECIS Index To 16mm Films, etc.

2.8 WORK COOPERATIVELY WITH UTLAS AND DEREK AUSTIN TO IMPROVE THE PRECIS SOFTWARE, WITH SPECIAL REFERENCE TO PROVIDING ON-LINE ACCESS BY SUBJECT TERM AND SUPERIOR EDITING PROCEDURES.

2.8.1 The testing of new PRECIS software has not been completed.

2.8.2 There has been one major constraint in expanding the use of PRECIS in Ontario beyond its present users who are: the Ontario Education Resources Information Service (ONTERIS); the National Film Board of Canada (NFB); and the York Region's PRECIS Project. It was found that the old PRECIS software, housed at UTLAS, could not support new clients. The program is inefficient when processing large volumes of data and is difficult to maintain.

2.8.3 Discussion regarding the possible integration of PRECIS into the UTLAS Subject Authorities System began in 1978. The PRECIS Users' Group, assisted by Prof. Ann Schabas of the Faculty of Library Science, University of Toronto, met several times with the UTLAS production and marketing teams. A decision was made by UTLAS to develop new PRECIS software that would incorporate many of the codes developed for the new British program. As an integral part of the UTLAS CATSS (Catalogue Support System), it would be called PRECIS/CATSS. A tentative target date for completion, February 1979, was not met. Mrs. Paula Lederman, then technical consultant for UTLAS, assumed the role of coordinator for all PRECIS activities on July 1979. In August 1979,there had been sufficient progress made in the programming to invite Derek Austin to confer with the UTLAS development team. Austin judged the design to be excellent, if it could be fully implemented.

2.8.4 The PRECIS Project team was asked to test the new program on behalf of the other Canadian users of PRECIS. In return for this service, UTLAS agreed to absorb the cost of computer time during the testing period and the cost of converting and indexing the two bibliographic files and the PRECIS files.

Testing began in December 1979, although the programming had not been completed to include a number of the new codes. Problems occurred both with the input of the data and the processing of products. Further field testing was postponed, first until June 1980, then until October 1980.

2.8.5 Progress has been made in the standardization of PRECIS products, bringing them into line with the other products of the Subject Authorities System.

2.8.6 The new software will permit on-line access by term for the indexer and will make available the excellent editing procedures used in CATSS. The proposed weekly PRECIS edits for the strings and the references will be superior to the present products. A new product will be the cumulative print-out of the PRECIS files on microfiche. It will be similar to the tool used by the PRECIS indexers of the Bibliographic Services Division of the British Library.

2.8.7 There remains a work flow problem which occurs when the indexer does not use PRECIS/CATSS on-line, but rather works off-line. PRECIS/CATSS is designed for interactive use, but this is not always feasible. UTLAS is studying the problem.

2.8.8 As the debugging of the program and the testing of the PRECIS software near completion, UTLAS has announced that PRECIS/CATSS will be available to its customers as an alternative to the Library of Congress Subject Heading system (LCSH). A marketing strategy for the new system is being developed. School boards and special libraries in Canada and the United States are the targets of the plan.

2.8.9 The possibility of developing, for PRECIS users, a Shared Authority File project similar to the one undertaken by public and university libraries using LCSH is under consideration. The PRECIS data base, built by this project, could make a significant contribution to the acceptance of PRECIS as a major indexing method in North America.

2.9 MAINTAIN CONTACT WITH OTHER PRECIS USERS/DEVELOPERS (e.g., ONTERIS, NATIONAL FILM FOARD, BRITISH LIBRARY BIBLIOGRAPHIC SERVICES DIVISION) AND WORK TO INTEGRATE ALL APPROPRIATE DEVELOPMENTS.

2.9.1 This objective has been attained and is, by nature, an on-going process. Interaction with these agencies has already been discussed in Subsections 2.7 and 2.8.

2.9.2 Contact with the other users and developers of PRECIS is maintained informally by correspondence, telephone conversations, and local meetings. The level of cooperation is exemplified by the strings used for testing the new PRECIS program. They include test strings developed for the British Library to check the algorithms and code validations, as well as representative samples from ONTERIS, NFB, and the York Region PRECIS Project.

2.9.3 Correspondence with Professor Fred Smith, Department of Library and Information Science, Loughborough University, Leicestershire, England, began early in 1980. Smith has been developing PRECIS software for the DIGICO minicomputer and also for the ITT Apple microcomputer using BASIC (computer language).

2.10 MAINTAIN CONTACT WITH THE BRITISH LIBRARY BIBLIOGRAPHIC SERVICES DIVISION (TRANSLINGUAL RESEARCH TEAM) IN ORDER TO EXPLORE FURTHER THE AUTOMATED TRANSLATION OF ENGLISH INTO FRENCH PRECIS STRINGS.

2.10.1 This objective has been attained.

2.10.2 Derek Austin informed us in February 1980 that the Final Report on the British Library PRECIS/Translingual project would soon be published. The British Library may, however, restrict the circulation of the algorithms or permit them to be programmed only under license or as part of a research project. Loughborough University may be permitted to develop the translingual software using a version of BASIC.

2.10.3 Austin has sent for comment a new proposal for the solution of the problem of coding a following difference in the French language (e.g., lait pasteurisé). A modifier rarely follows a noun in English except as a prepositional phrase (e.g., children with leukemia).

The development of a translingual option is important not only to many Ontario school boards but also to the NFB, which will publish both French and English strings in its catalogue indexes.

2.11 **PREPARE AND FIELD-TEST A WRITTEN GUIDE FOR PRECIS INDEXERS TO HELP THEM DEAL WITH ELEMENTARY AND SECONDARY SCHOOL MATERIALS WHERE, INITIALLY, THERE APPEAR TO BE DIFFERENCES IN CURRICULUM-RELATED TERMINOLOGY FOR IDENTICAL SUBJECT CONTENT.**

2.11.1 This objective has been attained. The field guide, entitled "The application of PRECIS to elementary school library collections; guidelines and challenges for indexers beginning the task" is a working document. It continues to be amended as new decisions are made based on accumulated experience and feedback from the field (See also Subsections 2.7.2 and 2.7.5).

2.11.2 The field guide was prepared by Irene McCordick, former Master Teacher of Libraries, The York Region Board of Education, and Co-Principal Investigator for the first phase of the project, 1976-78. The document was compiled following extensive discussion with elementary school librarians and teachers, and with the project's PRECIS indexers.

2.11.3 With the exception of literary works, no appreciable differences were found in curriculum-related terminology for identical subject content at both the elementary and secondary levels. Therefore, there has been considerable duplicate use of PRECIS strings for both elementary and secondary curriculum materials.

The indexers were surprised by the level of difficulty of terms encountered in many of the primary materials. It was found, for example, that authors deliberately introduce complex scientific terms, accompanied by a definition. To exclude these terms from the elementary PRECIS subject catalogues would be a disservice to

the pupils. Some teachers, however, complain that some of the scientific terminology is too advanced. It is possible that they are not familiar with some of the current learning materials.

2.11.4 The field guide explores the problems of indexing materials which belong to the various genres of children's literature. As discussed in Subsection 2.7, the indexing of literature, and in particular of fiction, has been neglected. The users of school libraries (teachers as well as students) have never been provided with even minimally adequate subject access to these materials. An examination of MARC records with LCSH indexing provides the proof of this assertion.

2.12 SURVEY THE LITERATURE ON AUTOMATED LIBRARY CATALOGUING/INDEXING SYSTEMS AND NETWORKING SYSTEMS AND ESTABLISH OR MAINTAIN CONTACT WITH SIMILAR DEVELOPMENTS USING INDEXING METHODS OR SYSTEMS OTHER THAN PRECIS (e.g., EURONET, NEPHIS).

2.12.1 This objective has been attained.

2.12.2 One of the most reliable sources for current information about developments in automated cataloguing, indexing, and networking has been a human network of Canadian librarians -- PRECIS users, the UTLAS staff, and other technical personnel. Library literature, as in the case of most professional writing, tends to be a year or more out of date. Through this human network, we are aware of the growing interest in PRECIS, both in Canada and the United States. As well, it has been possible to keep in touch with system developments which employ both microtechnology and the power of the minicomputer. It has been helpful to have discussions with other

school librarians about the implications of a national school library network. The Canadian School Library Association has formed a committee to monitor developments at the national level.

2.12.3 The NEsted PHrase Indexing System (NEPHIS) is a computer-assisted subject indexing method designed for use with small files of simple materials. Its successor, LInked PHrase Indexing System (LIPHIS), has been designed to index materials wh se subjects are complex, e.g., journal articles (Craven, 1978). The method has not been applied to school library materials.

2.12.4 There is a proliferation of information about automated cataloguing and networking in Canadian and American library journals. The articles range from the political implications of networking to the technological advances in the hardware.

2.12.5 There is evidence of a growing interest in and a concern about subject analysis and indexing. One writer expresses the concern by saying: "The year's work in subject analysis could provide that needed impetus for fundamental changes in the methods and tools so desperately needed if improvements in subject access are to meet the needs and expectations of library users with any measure of success" (Clack, 1980).

There is, however, a serious lack of awareness about the problems in school libraries in this regard. This lack is characterized by the very few journal articles which do cry out for action. One writer, Dr. Lillian Wehmeyer, Assistant Superintendent for Instruction, Lafayette School District, California, has challenged school

librarians to find a better way of analysing the subject content of learning materials by utilizing computer technology (Wehmeyer, 1976). It is this gap in school library research that this project addresses.

2.12.6 A sampling of the literature is available in the bibliography appended to this report (Appendix B).

2.13 TEST EXPERIMENTALLY THE VALIDITY OF THE PRECIS SUBJECT INDEX (ON MICROFICHE) AS A FINDING TOOL WITH A "NAIVE" STUDENT POPULATION IN AN "ALIEN" ENVIRONMENT.

2.13.1 Observation of the use of the microfiche catalogues, particularly the PRECIS subject index catalogue, has been carried out both in the elementary schools and in Aurora High School. To the extent that each new school was "alien" and its students "naive" about the project's catalogues, there was this degree of achievement of this objective.

2.13.2 The project planned to test its catalogues in a secondary school library which was not part of the project network. An activity was designed for this purpose. Basically, the testing involved facilitating interlibrary loan. Students could search the Aurora High School microfiche catalogues for materials not in their own school library. Initially, a librarian in another school in this region agreed to the proposed design, but later asked to withdraw. One can understand the reluctance of this librarian to expose his library users to a system which, if attractive to them, could not be sustained.

2.13.3 The use of the microfiche catalogues at Aurora High School has increased steadily since their inception in October 1978. Grade 9 students are introduced to the catalogues during their library orientation at the beginning of the school year. Their understanding is reinforced on an "as-needed" basis during class research periods at all grade levels.

It has been observed that many students now prefer to use the catalogues rather than conduct a haphazard search at the shelves. They have learned that, by using the catalogues, access to specific information is much faster and more precise.

It has become apparent, however, that many students lack the skills required to use even such basic reference tools as dictionaries and encyclopedias. A research skills program is, therefore, being planned in cooperation with concerned teachers. The program will include structured lessons in the use of the catalogues and other tools, in order to make students more aware of the need to formulate an intelligent search strategy.

Students have been observed browsing the catalogues out of general interest. When questioned, they admit that they enjoy browsing just to see what is there. The heavy use of the catalogues was observed recently during an evaluation of the resource centre's services by staff supervisory officers of The York Region Board of Education. They were not only impressed by the students' enthusiastic attitude to the microfiche catalogues, but also surprised by the depth and specificity of indexing which made visible the Canadian materials in the collection.

A school librarian from Vancouver, B.C., visited the project site in October 1979. She expressed the doubt, which has been echoed by other librarians, that students require specificity in subject entries when conducting a search in library catalogues. She questioned students in the Aurora High School resource centre and in a number of classrooms about their information needs. She concluded that the conventional subject headings are inadequate because they lack required specificity.

2.13.4 In general, there has been an equally positive response to the microfiche catalogues in the elementary schools, although the catalogues have not been in place as long as in Aurora High School. Pupils at Holland Landing Public School prefer the microfiche catalogues to the old card catalogue, which still provides access to the older materials in the collection. They like the fact that they can see more information at one time and that they can scan the microfiche easily and quickly. They realize too, that the PRECIS subject entries provide more detail; hence, they know with far greater certainty whether or not a particular book will be useful.[6]

The question was raised by an elementary school librarian as to whether or not the microfiche catalogues and readers could be used by grade 3 pupils. The Co-Principal Investigator of this research project visited Johnsview Village Public School in June 1980 with camera in hand. He captured the subsequent searching for materials

---

6. Students at Holland Landing, Glen Cedar, and Johnsview Village public schools were surveyed in March 1982 and these findings were reconfirmed.

in a series of candid shots (these have become part of a slide presentation used for workshops and seminars).

He observed that, given an assignment, many grade 3 pupils, though previously unexposed to the new system, can use the subject index catalogue and find appropriate materials with little or no help. About 25 per cent of the pupils needed only a simple explanation of the catalogue which was given by the teacher-librarian. About 25 per cent of the students required a little extra assistance at the microfiche reader. Some needed a reminder of how the Dewey Decimal Classification system works. Half of the class could not execute the assignment without substantial assistance. These students lacked experience of a library, generally. Their major problems often proved to be developmental in nature, e.g., a deficiency in reading readiness or in memory skills.

From these observations it becomes apparent that, in order to learn the use of a library and its tools, students require a certain level of developmental maturity before they can cope with any system. Further observation will provide data for structuring suitable lessons that will help pupils to apply the learning experiences of the classroom to the finding of information in a library using tools designed specifically for them.

At Glen Cedar Public School, all pupils from grades 3-8 were given orientation periods in the use of the microfiche catalogues. A TV Ontario program, "Read On", stimulated interest in certain authors, and pupils now readily use the author catalogue to look up works by featured writers.

Glen Cedar grades 1 and 2 pupils expressed interest in using the fiche to find books by their favorite authors. Older students and library monitors are now helping these youngsters to "search". The young pupils enjoy using the machines and are encouraged when they recognize some of the words in the catalogues and, with help, discover what books are in the library.

The Glen Cedar librarian reports that the fiche are easier to use than cards. Moreover, the colour coding at the top of the subject, title, and author fiche serve to remind pupils that there are three ways of looking for information, a fact which sometimes escapes even adult library users.

The Regency Acres Public School microfiche catalogues contain only 500 titles, the new acquisitions purchased since the fire at the school. The librarian has noted with interest that students who never before used the card catalogue now go to the microfiche catalogue first and then use the card catalogue as well.

2.13.5 As a part of an evaluation, there is a need to understand teachers' attitudes towards libraries and the value teachers give to information retrieval and processing as a part of the learning process. This kind of evaluation is not new but becomes even more important because of the increased emphasis on resource-based learning.

One teacher at Johnsview Village Public School describes his satisfaction with the subject catalogue, claiming that for him the real strength of the PRECIS method lies in the excellent cross-reference structure. He feels he can do a thorough search for materials when

preparing a unit of study by working through the cross-references, checking terms that he might otherwise have neglected.

On the whole, however, the use of the new catalogues by teachers has been disappointing. Many teachers just do not use library catalogues, preferring to leave the locating of relevant materials to the librarian.

Experience in giving seminars to educators about the value of information and the need for accessibility to learning materials has led to questions about appropriate methods for training teachers in the use of both libraries and curriculum-support materials. More and more often, principals of elementary schools are deciding not to staff libraries full time (some schools have never had full time librarians and some are staffed less than half time). Teachers who cannot use the library independently of a librarian are at a considerable disadvantage under such circumstances, and so are their pupils.

2.13.6 The number of seminars and workshops that PRECIS staff have been invited to give, the number of visitors to the project, and the numerous inquiries made by mail are all indicative of a considerable degree of professional interest both in this research and in better library utilization (See also Subsection 2.15).

2.14 PRODUCE COMPUTER-GENERATED TECHNICAL PRODUCTS (SHELF LIST CARDS, SPINE LABELS, LABELS FOR BOOK CARDS, LABELS FOR BOOK CARD POCKETS) FOR THE MATERIALS CATALOGUED FOR THE THREE ELEMENTARY SCHOOLS.

2.14.1 This objective has been attained, but there is a need for improve-

ment, particularly with the labels, that have been somewhat unsatisfactory.

2.14.2 Considerable difficulty was experienced in establishing the specifications for computer-produced shelf list cards and labels for the elementary schools.

This was the project's first experience with computer-produced labels. Until the first shipment of 1,700 computer-generated shelf list cards and relevant labels were received in October 1979, these products were produced manually by the project staff. Because of the delays and inconveniences, UTLAS waived the cost of all computer commands for these products for the catch-up period.

2.14.3 The labels continue to be a problem. The computer command used for generating labels for additional copies at a later date has not worked. More recently, changes in the format of the entry on the labels and in the font used for printing them have improved label appearance. Specifications for a new labels program are under development for the new UTLAS computer not yet in place. Improvements are expected, but the date for implementation of the program is indefinite. The project's experience with the application of computer technology to this type of product has not been satisfactory.

2.14.4 A new product has been developed for the elementary school members of the network. This is a printed union catalogue supplement organized by title (See Appendix D). The first supplement, October 1980, was a printout of the entire elementary bibliographic file,

some 5,464 records. Supplements are produced every thirteen weeks, with an annual cumulation every October. This product serves as:

(a) a selection tool for the purchasing of the core collection for new schools;

(b) a selection tool for present members of the mini-network;

(c) a listing that can encourage the development of a system of interlibrary loan.

It is possible that other uses can be found for this product as the librarians become familiar with it.

2.14.5 The readability of the microfiche produced subsequent to the first Aurora High School catalogues suffered by comparison. There has been an improvement in the last year. There is room for further improvement in the format. Recommendations made to UTLAS include the following:

(a) implementation of a "page-over" feature or "continued" note where information has been split between one frame (page) and the succeeding frame;

(b) deletion of the index on each microfiche card. Because the index lists only the first term occurring at the beginning of each frame, the user can be misled into believing the information he or she seeks is not available;

(c) consideration of a single column format, rather than the double column format presently used.

2.15 CONDUCT SEMINARS, WORKSHOPS, OR SIMILAR PRESENTATIONS TO EDUCATORS ACROSS ONTARIO, OR ELSEWHERE, TO PROMOTE UNDERSTANDING AND USE OF THE SYSTEM.

2.15.1 This objective has been attained.

2.15.2 The dissemination of information about this project and its contribution to library and education research has been done by the following means:

(a) off-site seminars and workshops;
(b) demonstrations at the project sites;
(c) correspondence;
(d) published articles.

It has been interesting to observe changes in focus both in the seminars and workshops, and in the concern expressed by the audiences since 1976.

(a) In 1976, the PRECIS workshops consisted of an explanation of the method. Librarians reacted with interest but realized that in their individual libraries they could not single-handedly implement the system.

(b) In 1977-78, the research project had products to illustrate the benefits of computerized cataloguing and the increased subject access available through PRECIS. The audiences were still relatively unaware of the uses of computers in libraries. School librarians were sceptical about the willingness of school boards to allocate funds to develop the centralized technical service centres necessary for automation. The general reaction to the microfiche catalogues was very positive: "We like it", "We need it", "When can we have it?". A typical negative reaction was: "We'll wait until someone else funds it and the system is operational".

(c) In 1979-80, school library conferences had begun to focus on automation. Audiences were divided between those who recognized the need for change and those who felt threatened by change. Reactions to the PRECIS Project shifted focus. Questions became challenges. "Why use microfiche? On-line is the only answer." "Use the microcomputer. It can do everything that needs to be done." The use of microcomputers in school libraries has been restricted to computer-assisted learning and housekeeping tasks. The utilization of microtechnology for on-line catalogues is still in the developmental stage.

2.15.3 Visitors to the project site have been interested in the technical aspects of automated cataloguing, the potential benefits of networking for school libraries, and the use of PRECIS as a superior method for subject indexing. The reaction to the project's work has been very positive; the major concerns have been that implementation of a network would be difficult and, initially, costly, even though great economies would be realized in time.

2.15.4 Inquiries have come from around the world, from English-speaking countries, from Europe, from Asia, from all parts of Canada. Inquiries have come from national library systems, university and public libraries, archival libraries, and school libraries. There is a strong indication of a growing recognition of the need for change in library services, particularly in the area of access to information.

SECTION IV: Appendices

Appendix A: Glossary

Access point: The term at which you enter an index.

Algorithm: In computer science, the step-by-step procedure followed by the computer in an operation for accomplishing a given result.

Audiovisual materials: An alternative term for non-print materials (e.g., filmstrips, recordings).

Bibliographic data base: Computer storage of cataloguing information used for production of catalogues for a network of libraries.

Bibliographic network: Central computer services shared by a number of library systems for maximum access to cataloguing records.

Bibliographic record: Complete cataloguing data for a document (e.g., author, title, publisher, etc.).

British National Bibliography: The national bibliography of Great Britain, published weekly, cumulated monthly and annually. Now a part of the Bibliographic Services Division of the British Library.

CATSS (Catalogue Support System): UTLAS's bibliographic data base service which provides cataloguing and technical processing for library systems.

Citation: A bibliographic description of a document in a catalogue.

Classified catalogue: A listing of bibliographic citations arranged by a classification system with a separate subject index (e.g., the British National Bibliography which has a back-of-the-book subject index).

COM (Computer Output Microform): Information stored on computer tape reproduced by microphotography either on rollfilm or microfiche.

Deriving: The on-line search for and location of a bibliographic (cataloguing) record in a bibliographic data base.

Dewey Decimal Classification: A system of notation used to organize library materials systematically by subject.

EURONET: A European educational information retrieval service.

Hit rate: The expression (as a percentage) of cataloguing records derived from a bibliographic data base.

Index entry: The terms which describe a given subject in a subject index.

ISBN (International Standard Book Number): An internationally agreed-upon standard numbering system which uniquely identifies the language of publication, the publisher, and the title of a published book.

Appendix A (cont'd.)

Lead term: A word or compound term used as a point of entry in a PRECIS subject index (access point).

MARC (MAchine-Readable Cataloguing): A cataloguing format (on magnetic tape) developed by the Library of Congress to facilitate sharing bibliographic data nationally and internationally. MARC records can be manipulated by a computer to produce, for example, a COM catalogue. Many countries have their own adaptation (e.g., CAN MARC, UK MARC).

Multimedia kit: An item containing two or more categories of materials (e.g., filmstrip and tape) neither one of which is identifiable as the predominant constituent.

NEPHIS (NEsted PHrase Indexing System): A computer-assisted string-indexing system.

Non-print: An alternative term for audiovisual materials (e.g., filmstrips, films, recordings).

ONTERIS (Ontario Education Resources Information Service): A data base of educational research documents, curriculum guidelines, and major Ministry of Education studies (CODE, SERP), which can be searched on-line through a computer terminal, or a printed PRECIS index.

On-line: Direct telephone access to computer files using a computer terminal.

One-stage catalogue: The subject entry is linked directly to the relevant citations. (Cf. the two-stage, classified catalogue in which the subject entry is listed in an alphabetical index pointing to a separate classified section containing the citations.) The appended PRECIS subject catalogues are one-stage.

PRECIS (PREserved Context Index System): A computer-assisted subject indexing method designed originally for the British National Bibliography.

PRECIS/CATSS: The new PRECIS software to be integrated into the UTLAS Catalogue Support Systems' Authorities facility.

RIN (Reference Indicator Number): In PRECIS, the unique number given to each term stored in the reference file.

RINfile: The machine-stored file of lead terms and all other thesaural terms used for "See" and "See also" references for a PRECIS index.

Role operator: A computer code which determines the format of the PRECIS index entries, the typography of each term and its associated punctuation.

RSN (Record Sequence Number): A unique number assigned by the computer to each bibliographic record in a machine-held file.

Appendix A (cont'd.)

SIN (Subject Indicator Number): In PRECIS, the unique number assigned to the PRECIS "string" to identify the total subject packet. The SIN is entered in the bibliographic record of all documents to which the subject data are applicable.

SINfile: The machine-held file of PRECIS "strings".

String: In PRECIS, a syntactically ordered sequence of terms from which the computer generates index entries.

Subject entry: The terms used to describe the subject content of a document in an alphabetical subject index (used interchangeably with "index entry").

Subject heading: The format of the subject description used in Library of Congress Subject Headings and Sears Subject Headings for an alphabetical subject index.

Tag: A unique numeric code assigned to the various fields of a computer-stored record (such as the MARC records).

Union file: A bibliographic file which holds one bibliographic record for each unique item regardless of the number of libraries holding the title. Each owner of the item is identified by an alphabetic WHO code which is stored in a specially designated tag or field of the record.

UTLAS (University of Toronto Library Automation Systems): An international bibliographic utility supplying computer-based systems, services and products in both French and English to libraries in Canada, the United States, and Japan.

Appendix B: Bibliography

ALCOCK, Miranda. "The Learning Materials Recording Study: a joint British Library/Inner London Education Authority research project", The Audiovisual Librarian, Vol. 5, No. 2 (Spring 1979)

Audio-visual materials: development of a national cataloguing and information service: report of a joint feasibility study. Council for Educational Technology Working Paper 12. London: Council for Educational Technology, 1976

AUSTIN, Derek. "PRECIS in a multilingual context".
Part 1, "PRECIS: an overview", Libri, Vol. 26 (March 1976)
Part 2, SORENSEN, Jutta and Derek AUSTIN. "A linguistic and logical explanation of the syntax", Libri, Vol. 26 (June 1976)
Part 3, SORENSEN, Jutta and Derek AUSTIN. "Multilingual experiments, proposed codes, and procedures for the Germanic languages", Libri, Vol. 26 (September 1976)
Part 4, LAMBERT, G. "The application of PRECIS in French", Libri, Vol. 26 (December 1976)

AUSTIN, Derek. PRECIS: a manual of concept analysis and subject indexing. London: The Council of the British National Bibliography, 1974

AUSTIN, Derek and Jeremy DIGGER. "PRECIS: The Preserved Context Index System", Library Resources and Technical Services, Vol. 21, No. 1 (Winter 1977)

BAKEWELL, K. G. B. Classification and indexing practice. London: Clive Bingley, 1978

BAKEWELL, K. G. B. A study of indexers' reactions to the PRECIS indexing system. Final report to the British Library Research and Development Department on Project SI/G/207. Liverpool: Department of Library and Information Studies, Liverpool Polytechnic, 1978

BALDWIN, Paul E. "BCUC launched into a replication study", Canadian Library Journal, Vol. 37, No. 6 (December 1980)

BEARDSLEY, Barbara and Ilze COCKBURN. ONTERIS: printed index. Vol. 1. Abstracts of Ministry funded research and school board research in Metropolitan Toronto from 1959-1976. Vol. 2. Subject and author index to Ministry funded research and school board research in Metropolitan Toronto from 1959-1976. Toronto: Ontario Ministry of Education, 1977

BERMAN, Sanford. "Getting to it; a guest editorial", American Libraries, Vol. 8, No. 2 (February 1977)

BERMAN, Sanford. "Children, 'Idiots', the", School Library Journal, Vol. 18, No. 4 (December 1971)

BETT, Carolyn E. "The Subject Access Project: a comparison with PRECIS", The Indexer, Vol. 11 (April 1979)

Appendix B (cont'd.)

BENDER, David R. "Networking and school library media programs", School Library Journal, Vol. 26, No. 3 (November 1979)

BRYANT, Philip and Angela NEEDHAM. "You need long nails", Catalogue and Index, No. 33 (Spring 1974)

BRYANT, Philip, Gillian M. VENNER, and Maurice B. LINE. The Bath mini-catalogue: a progress report. Bath, England: Bath University Library, 1972

BURNHAM, Brian, Irene McCORDICK, and Audrey TAYLOR. A computer-based catalogue linking the PRECIS subject indexing system to school library materials; building a model for an Ontario-wide information network for school libraries: a developmental research project funded by the Ministry of Education, Ontario. Aurora: York County Board of Education, 1978

Canadian Materials Network Group. A Canadian Materials Bibliographic Network for Education. Toronto: Canadian Materials Network Group, 1974

CLACK, Doris Hargrett. "Year's work in subject analysis: 1979", Library Resources & Technical Services, Vol. 24, No. 3 (Summer 1980)

COTÉ, Jean-Pierre. "PRECIS et le système de vedettes-matiere de la Library of Congress: vers une étude comparative global", Documentation et Bibliotheques (Mars 1979)

CRAVEN, Timothy C. "Linked phrase indexing", Information Processing and Management, Vol. 14 (1978)

CURLEY, Elizabeth McDonald. "On-line reference services and teacher/librarians", Canadian Library Journal, Vol. 36, No. 5 (October 1979)

"Database content -- Aurora High School". University of Toronto Library Automation Systems Newsletter, Vol. 2, No. 5 (May 1977)

DYKSTRA, Mary. "The lion that squeaked", Library Journal, Vol. 103, No. 15 (September 1, 1978)

ELLIOTT, Adrienne, Frank KARRAS, and Lorne MACRAE. "Similar Futures: school libraries and networks", School Libraries in Canada, Vol. 1, No. 3 (Spring 1981)

FRANCHOWIAK, Bernard. "Networks, data bases, and media programs", School Media Quarterly, Vol. 6, No. 1 (Fall 1977)

FUGMANN, Robert. "Toward a theory of information supply and indexing", International Classification, Vol. 6 (1979)

GARDHOUSE, Judy. "NFB develops delivery service for Canadian non-print media", Canadian Library Journal, Vol. 37, No. 2 (April 1980)

HARROD, Leonard Montague, comp. Indexers on indexing: a selection of articles published in The Indexer. New York: Bowker, 1978

Appendix B (cont'd.)

HINES, Theodore C. "Crisis in children's cataloguing", Library Journal (December 15, 1966)

HINES, Theodore C., Lois WINKEL, and Rosann COLLINS. "The children's data bank", Top of the News, Vol. 36, No. 2 (Winter 1980)

HORNER, William C. "The use and economics of computer-generated microfiche catalogues", North Carolina Libraries, Vol. 33 (Winter 1975)

Information Services Co-ordinating Group. "New wave is not quite with us, yet", Canadian Library Journal, Vol. 38, No. 1 (February 1981)

JANKE, Richard V. "Time for an alternative", Ontario Library Review, Vol. 63, No. 3 (September 1979)

KOGAN, Marilyn. "Studies in catalogue access" (mimeo). Unpublished student's paper, School of Library and Information Science, University of Western Ontario, n.d.

KOGAN, Marilyn and George WHALEN. Organizing the school library; a Canadian handbook. Toronto: McGraw-Hill Ryerson, 1980

KOLB, Audrey. "Development and potential of a multitype library network", School Media Quarterly, Vol. 6, No. 1 (Fall 1977)

KOLB, Audrey and Jo MORSE. "Initiating school participation in networking", School Media Quarterly, Vol. 6, No. 1 (Fall 1977)

MacINTOSH, Helen. "File-sharing -- the Canadian experience", Ontario Library Review, Vol. 61, No. 4 (December 1977)

MARTIN, Susan K. "The quest for a national bibliographic network", Library Journal, Vol. 103, No. 1 (January 1, 1978)

MATTER, Rosemarie von. "PRECIS als Wischensprachliches system", Documentation Information, Vol. 30 (1979)

McCORDICK, Irene. "Professional growth: the uses of technology", The Revolting Librarian, Vol. 6, No. 2 (June 1979)

MILSTEAD, Jessica L. "Natural versus inverted word order in subject headings", Library Resources & Technical Services, Vol. 24, No. 2 (Spring 1980)

NEALE, Colin. "Proposed course of action to implement an information/distribution system for Canadian audio-visual products" (mimeo). Montreal: National Film Board of Canada, staff paper, November 25, 1977

NEILL, S. D. Canadian libraries in 2010. Vancouver: Parabola Systems, 1980

"Networking and the schools; a discussion by the AASL committee on networking", Wisconsin Library Bulletin, Vol. 71 (May-June 1975)

Appendix B (cont'd.)

NEWMAN, William L. et al. "DOBIS, the Canadian government version", Canadian Library Journal, Vol. 36, No. 4 (August 1979)

PEJTERSEN, Annelise Mark. "Design of a classification scheme for fiction based on an analysis of actual user-librarian communication, and use of the scheme for control of librarians' search strategies", Second International Research Forum on Information Science. New York: Science Associates/International, 1978

PEJTERSEN, Annelise Mark. "Fiction and library classification", Scandinavian Public Library Quarterly, No. 1 (1978)

PEJTERSEN, Annelise Mark. "The meaning of 'about' in fiction indexing and retrieval", ASLIB Proceedings, Vol. 31, No. 5 (May 1979)

ROBINSON, C. Derek, comp. PRECIS: an annotated bibliography; 2nd ed., 1969-1977. Toronto: C. D. Robinson, 1977

ROBINSON, C. Derek. "PRECIS Canada: achievements and prospects", Canadian Journal of Information Science, Vol. 4 (Spring 1979)

RODGER, David. "The Learning Materials Recording Study", British Library Bibliographic Services Division Newsletter, No. 4 (February 1977)

SCHABAS, Ann H. "Post-coordinate retrieval: a comparison of two indexing languages", Journal of American Society for Information Science (in press)

SEVIGNY, Allen. "Firm basis for cooperatives; an RPO looks at systems and multitype councils", Wisconsin Library Bulletin, Vol. 73 (November-December 1977)

SHIFRIN, Malcolm. Information in the school library: an introduction to the organization of non-book materials. London: Clive Bingley, 1973

SIVE, Mary. "PRECIS - a better way to index films", Sightlines, Vol. 13 (Winter 1979-1980)

SMITH, Eldred. "Politics of cooperation in a networking era", Canadian Library Journal, Vol. 37, No. 5 (October 1980)

SØRENSEN, Jutta, comp. A bibliography of PRECIS, 2nd edition. Copenhagen: Royal School of Librarianship, 1979

SØRENSEN, Jutta. "PRECIS somgesystem", Bogens Verden, Argang 61, NR 7 (1979)

STEINWEG, Hilda. "Specificity in subject headings", Library Resources & Technical Services, Vol. 23, No. 1 (Winter 1979)

STIERWALT, Ralph E. "Cooperative library system for Ontario universities", Ontario Library Review, Vol. 58 (June 1974)

Appendix B (cont'd.)

Task Force on the Role of the School Library Media Program in the National Program. The role of the school library media program on networking. Washington, D. C.: National Commission on Libraries and Information Science, 1978

TAYLOR, Audrey and Irene McCORDICK. "PRECIS can revolutionize subject access to information in school resource centres", Canadian Library Journal, Vol. 33, No. 6 (December 1976)

THRALL, William Flint and Addison HIBBARD. A Handbook to literature, rev. ed. New York: Odyssey Press, 1960

TWADDLE, Dan R. "School media services and automation", School Media Quarterly, Vol. 7, No. 4 (Summer 1979)

VICKERS, Robert and David HOWARTH. "The British Education Index: present and future", British Library Bibliographic Services Division Newsletter, No. 18 (August 1980)

WEHMEYER, Lillian. "Media and learning: present and future"
Part I "Present", Catholic Library World, (November 1978)
Part II "The future", Catholic Library World, (December 1978)

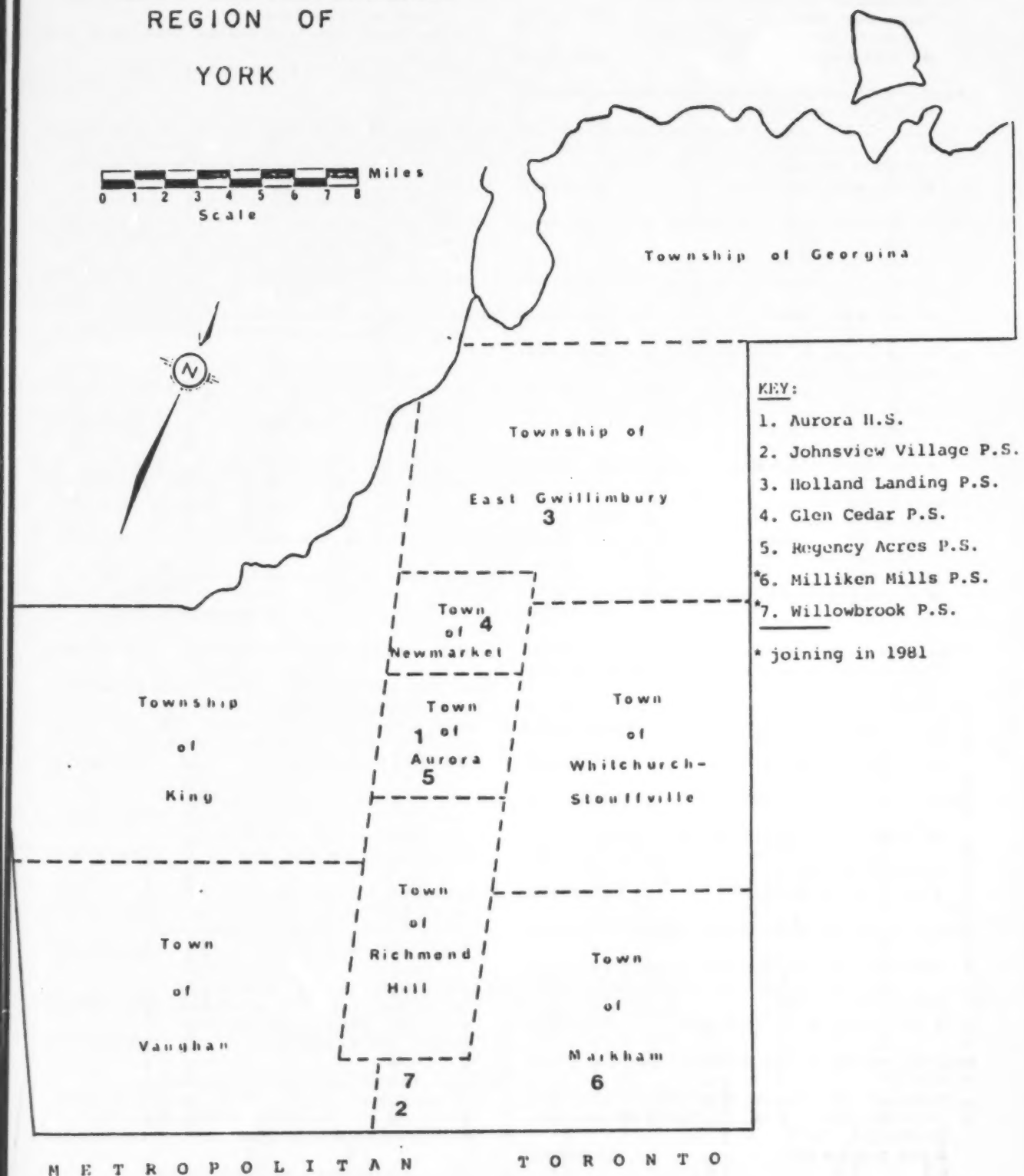
WEHMEYER, Lillian. "Cataloguing the school media centre as a specialized collection", Library Resources & Technical Services, Vol. 20, No. 4 (Fall 1976)

WELLISCH, Hans H., ed. The PRECIS index system: principles, applications, and prospects. Proceedings of the International PRECIS Workshop Sponsored by The College of Library and Information Services of the University of Maryland, October 15-17, 1976. New York: H. W. Wilson, 1977

WILSON, Patrick. "The end of specificity", Library Resources & Technical Services, Vol. 23, No. 2 (Spring 1979)

WILTSHIRE, Carol. "The Aurora High School PRECIS Project", Dalhousie School of Library Services Newsletter, Vol. 8, No. 1 (December 1978)

Appendix C: PRECIS mini-network



Appendix D: AUE UNION CATALOGUE SUPPLEMENT JAN. 09 1981

The adventures of Tom Sawyer / Mari Twain --
Twain, Mark. New York : Pyramid Books, 1966. 222 p. ; 18 cm. -- (Pyramid adventure classics)
■ F TWA ■ HLLD (35480716)

Agouhanna / Translated from the French by Harvey Swados ; illustrated by Julie Brinckloe --
Aubry, Claude. Toronto : Doubleday Canada, Garden City, N.Y. : Doubleday, 1972. 89 p. : ill. ; 25 cm. LC: 72076209 /AC ISBN: 038504786X: $4.50
■ F AUB ■ MILL HLLD JHSV (35476936)

Akavak : an Eskimo journey / Written and illustrated by James Houston --
Houston, James A. New York : Harcourt, Brace & World, [1968] 75 p. : illus. ; 21 cm. LC: 68026426 ISBN: 0152017291
■ F HOU ■ MILL JHSV (35475625)

Albert Schweitzer, great humanitarian / by Elizabeth Rider Montgomery ; illustrated by William Hutchinson. --
Montgomery, Elizabeth Rider. Champaign, Ill. : Garrard Pub. Co., [1971] 144 p. : illus., ports. ; 22 cm. -- (A People in the arts and sciences book) LC: 70132035 / AC ISBN: 081164510x: $2.59
■ 266.025 SCH MON ■ MILL HLLD JHSV (35475609)

Alberta / Anthony Hocking --
Hocking, Anthony. Toronto : McGraw-Hill Ryerson, c1979. 80 p. : ill. (some col.), map (some col.) ; 29 cm. -- (Canada series) CAN: 770016057 ISBN: 0070826870
■ 917.123 HOC ■ MILL REGA GCED HLLD JHSV (35477960)

Alberta; where the mountains meet the plains / Doreen Margaret Tomkins, with George S. Tomkins and Neville V. Scarfe --
Tomkins, Doreen Margaret. Toronto : Gage, 1970. 43 p. : ill., maps (some col.), 26 cm. -- (Regional studies of Canada) ISBN: 07715830 1X pa.
■ 917.123 TOM ■ MILL JHSV (35475844)

Album of astronomy / by Tom McGowen ; illustrated by Rod Ruth --
McGowen, Tom. Chicago : Rand McNally, c1979. 64 p. : ill. (some col.) ; 29 cm. LC: 79009485 /AC ISBN: 0528820486 : 582
■ 523.1 MCG ■ MILL JHSV (35479555)

Album of sharks / by Tom McGowen ; illustrated by Rod Ruth. --
McGowen, Tom. Chicago : Rand McNally, c1977. 60 p. : ill. (some col.), 29 cm. LC: 77005172 /AC ISBN: 0528820230 : $5.95.
■ 597.31 MCG ■ MILL REGA GCED (35477933)

Album of whales / by Tom McGowen ; illustrated by Rod Ruth --
McGowen, Tom. Chicago : Rand McNally, c1980. 61 p. : ill. (some col.) ; 29 cm. LC: 80012904 /AC ISBN: 052882287X : $6.95
■ 599.5 MCG ■ MILL (35480879)

Alexander and the terrible, horrible, no good, very bad day / Judith Viorst ; illustrated by Ray Cruz. --
Viorst, Judith. New York : Atheneum, 1978, c1972. [32] p. : ill. ; 20 cm. ISBN: 0689300727 : 850
■ E VIO ■ MILL GCED HLLD JHSV (35478632)

Alexander Mackenzie, Canadian explorer / by Ronald Syme ; illustrated by William Stobbs. --
Syme, Ronald. New York : Morrow, 1964. 96 p. : illus. ; 22 cm. LC: 64010133
■ 971.03 MAC SYM ■ MILL GCED HLLD JHSV (35475761)

Alfred Hitchcock and the three investigators in The mystery of the headless horse : based on characters created by Robert Arthur / text by William Arden [i.e. D. Lynds] ; illustrated by Jack Hearne. --
Arden, William, pseud. New York : Random House, [1977] viii, 151 p. : ill. ; 22 cm. -- (Alfred Hitchcock mystery series ; 26) LC: 77074458 /AC ISBN: 0394835697 : $2.50
■ F ARD ■ JHSV REGA HLLD (35476090)

All aboard : a cross-Canada adventure / written and photographed by Barbara O'Kelly and Beverley Allinson. --
O'Kelly, Barbara. Toronto : Greey de Pencier Books, c1979. 95 p. : ill. (some col.) ; 23 cm. ISBN: 0919872441 pa
■ F OKE ■ MILL REGA GCED (35477547)

All about ghosts / [written by Christopher Maynard] --
Maynard, Christopher. London : Usborne Pub., 1977. 32 p. : ill. ; 28 cm. -- (The World of the unknown) ISBN: 0860201481 pa
■ 1 MAY ■ HLLD REGA GCED (35476701)

All about monsters / [written by Carey Miller] --
Miller, Carey. London : Usborne, 1977. 32 p. : ill. ; 28 cm. -- (The world of the unknown) ISBN: 0860201473 : $5.95
■ 001.944 MIL ■ HLLD REGA GCED (35477943)

The all colour book of Bible stories / retold by Patricia J. Hunt ; illustrated by Giovanni Casselli --
Hunt, Patricia J. London : Sundial, 1978. 157 p. : col. ill. ; 29 cm. ISBN: 0904230511 : $6.95
■ 220.95 HUN ■ JHSV (35480752)

The all colour world of cars / Phil Drackett. --
Drackett, Phil. London : Octopus Books, 1979. 104 p. : col. ill. ; 30 cm. ISBN: 0706410076
■ 629.222 DRA ■ GCED JHSV (35477971)

All colour world of cats / Peter McHoy --
McHoy, Peter. London : Octopus Books, 1978. 104 p. : col. ill. ; 30 cm. ISBN: 070647458 : 750
■ 636.8 MCH ■ GCED JHSV (35480164)

All colour world of dogs / David Squire --
Squire, David. London : Octopus Books, 1978. 104 p. : ill. ; 31 cm. ISBN: 0709407466 : 477
■ 636.7 SQU ■ GCED JHSV (35480162)

All Colour world of farm animals / Robert Burton. --
Burton, Robert. London : Octopus Books Ltd., 1979. 104 p. : col. ill. ; 30 cm. ISBN: 0706410084 : 750.
■ 636.088 BUR ■ GCED JHSV (35480163)

All colour world of horses / Peter Churchill --
Churchill, Peter. London : Octopus Books, 1978. 104 p. : col. ill. ; 30 cm. ISBN: 0706407474 : 795
■ 636.1 CHU ■ GCED JHSV (35480165)

ICE AGES. Pleistocene epoch. North America
Great ice ages

551 .312 STO The Story of ice and glaciers. [Multimedia, 2d ed. -- 1978

ICE CREAM
-- Recipes

641 .374 HAL I love ice cream. Hall, Carolyn Vosburg. 1976

ICE CREAM
Origins

641 .3 RUS Peanuts, popcorn, ice cream, candy, and soda pop, and how they began. Russell, Solveig Paulson. [1970]

ICE HOCKEY See HOCKEY

ICE SKATING See SKATING

ICEBERGS. Antarctic Ocean
Formation

551 .34 LAU Junior science book of icebergs and glaciers. Lauber, Patricia. c1961
551 .34 SCH Icebergs and their voyages. Schultz, Gwen M. 1975
551 .46 TYL The children's book of the seas. Tyler, Jenny. 1976

ICEBERGS. Arctic Ocean
Greenland icebergs

551 .34 LAU Junior science book of icebergs and glaciers. Lauber, Patricia. c1961
551 .34 SCH Icebergs and their voyages. Schultz, Gwen M. 1975

ICEBERGS. Polar regions
Formation

551 .342 GAN Icebergs. Gans, Roma. [1964]

ICELAND
Geography

914 .912 BUR Iceland in pictures. Burks, John B. c1977

ICELAND
History, to ca 1970

914 .912 BUR Iceland in pictures. Burks, John B. c1977

ICELANDIC CULTURE

914 .912 BUR Iceland in pictures. Burks, John B. c1977

ICELANDIC FOLK TALES
-- Texts

389 .22 MCG Half a kingdom : an Icelandic folktale. McGovern, Ann. c1977

IDEAL WORLDS See UTOPIAS

IDENTITY
See also
SELF-IMAGE

IDENTITY
Canadian identity

971 CAN Canada and the world. [Multimedia, 1976
971 UNI Unity in diversity. [Multimedia, 1976

IDENTITY. Adopted teenage girls
Search for identity -- Novels

F LEA Answering Miss Roberts. Leach, Christopher. 1976, c1968

IDENTITY. Black children
-- Poems

811 .54 ADO Big sister tells me that I'm Black. Adoff, Arnold. c1976

IDENTITY. Black girls. United States
Cultural identity -- Novels

F HAM Zeely. Hamilton, Virginia. 1967

METEORS
See also
CORETS

METEORS

523 .2 ZIM Stars : a guide to the constellations, sun, moon, planets and other features of the heavens. Zim, Herbert Spencer. ¿Rev. ed. ; -- 1975

METIS. Canada

970 .00497 CAM Riel's people : how the Metis lived. Campbell, Maria. 1978
970 .00497 IND Indians without tipis : a resource book c1974

METIS. Canada
Cuthbert Grant -- Biographies

971 .2701 SEA Cuthbert Grant and the Métis. Sealey, D. Bruce. c1976

METIS. Canada
Gabriel Dumont -- Biographies

971 .054 DUM WOO Gabriel Dumont. Woodcock, George. c1978

METIS. Canada
Louis Riel -- Biographies

971 .05 RIE NEE Louis Riel. Neering, Rosemary. c1977

METIS. Canada
Louis Riel -- Historical novels

F TRU A very small rebellion. Truss, Jan. 1977

METIS. Grantown. Manitoba
Settlement, ca 1824

971 .2701 SEA Cuthbert Grant and the Métis. Sealey, D. Bruce. c1976

METIS. Manitoba
Political conflicts with federal government, 1867-1900

F TRU A very small rebellion. Truss, Jan. 1977

METIS. Northern Canada
Land claims. Conflicts with federal government, 1970. Role of Metis teenagers -- Novels

F TRU A very small rebellion. Truss, Jan. 1977

METIS BOYS
Canadian Indian heritage. Conflicts with white culture, ca 1800 -- Novels

F CUT Carry my bones northwest. Cutt, W. Towrie. 1973

METIS TEENAGERS
Role in conflicts between federal government & Metis over land claims, 1970 -- Novels

F TRU A very small rebellion. Truss, Jan. 1977

METRIC GAMES
-- Collections

793 .74 HAL The metric book of amusing things to do. Hallamore, Elisabeth. c1974

METRIC SYSTEM
Units of measurement

389 .15 SEG One meter Max. Segan, Ann. c1979
389 .152 LEA Metric can be fun! Leaf, Munro. 1st ed. -- c1976

METRIC SYSTEM
Use in measurement -- Projects

389 .152 BRA Measure with metric. Branley, Franklyn Mansfield. ¿1975¿

METRIC SYSTEM
Use in measurement of volume

389 .15 MEA Measuring volume. ¿Multimedia¿. -- 1974

METROPOLIS See CITIES

MEXICAN AMERICANS. Migrant farm workers. California
Labour unions. Organization. Role of Cesar Chavez

331 .8809 CHA FRA Cesar Chavez. Franchere, Ruth. ¿1970¿

FISHING. Canadian Shield

917.1 HUN Hunting and fishing in the Canadian Shield. [Filmstrip]. -- 1967

FISHING. Oceans
Commercial fishing

500.9 OMM The fishes. Ommanney, Francis Downes. [1970]
639.2 JEN Silver haul: trawling and deepsea fishing Jenkins, Alan C. 1967

FISHING. Oceans
Commercial fishing. As a cause of depletion of fish

333.9164 MIC The oceans in tomorrow's world : how can we use and protect them? Michelsohn, David Reuben. [1972]

FISHING. Oceans
Commercial fishing. Trawling

639.2 JEN Silver haul: trawling and deepsea fishing. Jenkins, Alan C. 1967

FISHING. Salmon. Alaska
Commercial fishing, ca 1950 -- Novels

F MOR Gentle Ben. Morey, Walter. c1965

FISHING. Salmon. British Columbia
Commercial fishing

338.372755 SAL Salmon fishing in British Columbia. [Filmstrip] 1972

FISHING INDUSTRY. British Columbia
Commercial fishing industry

338.372 BRI British Columbia : fishing. [Filmstrip]. - 1968

FISHING INDUSTRY. Canada
Commercial fishing industry

338.47688790971 MAN Canada's fisheries. Manchester, Lorne. 1970
917.1 INN Canada : a geographic study. Innis, Donald Quayle. c1966

FISHING INDUSTRY. Canada
Commercial fishing industry -- Statistics

REF 317.1 CAN Canada year book 1970-71: statistical annual of the resources, demography, institutions and social and economic conditions of Canada. -- Canada. Statistics Canada. 1971
REF 317.1 CAN Canada year book 1973 : an annual review of economic, social and political developments in Canada. -- Canada. Statistics Canada. 1973
REF 317.1 CAN Canada year book 1975 : an annual review of economic, social and political developments in Canada. -- Canada. Statistics Canada. 1975
REF 317.1 CAN Canada year book 1976-77 : an annual review of economic, social and political developments in Canada. -- Canada. Statistics Canada. 1977
REF 317.1 CAN Canada year book 1980-81 : a review of economic, social and political developments in Canada. -- Canada. Statistics Canada. 1981
REF 971.05 CAN Canada; one hundred 1867-1967. -- Canada. Dominion Bureau of Statistics. 1967

FISHING INDUSTRY. Japan
Commercial fishing industry

338.4768879 JAP Japanese fisherman. [Filmstrip] 1959

FISHING INDUSTRY. Norway
Commercial fishing industry

914.8103 NAW Norway. Nawrath, Alfred. 1965

FISHING INDUSTRY. Ontario
Commercial fishing industry -- Statistics

REF 317.13 ONT Ontario statistics 1975; volume 2. Ontario. Ministry of Treasury, Economics and Intergovernmental Affairs. 1975
REF 317.13 ONT Ontario statistics 1976; volume 2. Ontario. Ministry of Treasury, Economics and Intergovernmental Affairs. 1976

FITNESS See PHYSICAL FITNESS

FOOD PLANTS See EDIBLE PLANTS

FOOD POISONING
Caused by bacteria

301.31 BEN Our precarious habitat. Benarde, Melvin A. Rev. ed. -- 1973
641.1 PYK Success in nutrition. Pyke, Magnus. c1975

FOOD PRODUCTS. Canada
Supply & demand

330 SAM Economics. Samuelson, Paul Anthony. 4th Canadian ed. -- c1975
330.971 ARM The Canadian economy and its problems. Armstrong, Muriel. [1970]
338.43613 STE Hard to swallow : why food prices keep rising, and what can be done about it. Stewart, Walter. 1974

FOOD PYRAMIDS See FOOD CHAINS

FOOD RESOURCES
See also
FISHERIES RESOURCES

FOOD RESOURCES

338.19 RES Resources of the world ; foods & their sources. (Filmstrip) 1974

FOOD RESOURCES
Productivity. Improvement

301.32 FAG Challenge for change : geographical approaches to selected world issues. Fagan, Margaret. 1977
338.19 HEY How will we feed the hungry billions? Food for tomorrow's world. Hey, Nigel S. [1971]
338.19 LOW World population and food supply. Lowry, J. H. 1970
641.3008 HOF Food: readings from Scientific American. Hoff, Johan E., comp. [1973]

FOOD SUPPLY
See also
FAMINE

FOOD SUPPLY
World food supply

REF 910.3 LAN Lands and peoples; volume 7. [1972]
301.31 NOB The complete ecology fact book. Nobile, Philip, comp. 1972
330.971 COU Growth in a conserving society : based on papers prepared for the 47th Couchiching Conference of the Canadian Institute on Public Affairs. Couchiching Conference, 47th, Geneva Park Ont., 1978. c1979
338.19 BOR The hungry planet; the modern world at the edge of famine. Borgstrom, Georg. Rev. ed. -- [1967]
338.19 COC The world food problem; a guardedly optimistic view. Cochrane, Willard Wesley [1969]
500.2 SEB Food and nutrition. Sebrell, William Henry. [1967]

FOOD SUPPLY
World food supply. Role of edible flowering plants

641.3 FRI Plants that feed the world. Frisch, Rose E. 1966

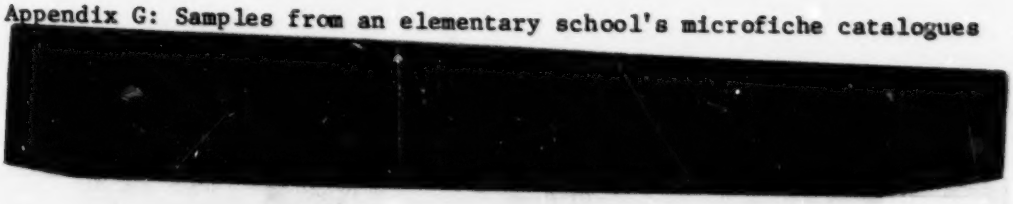
FOOD SUPPLY
World food supply related to overpopulation

301.3 FRA The people problem; what you should know about growing population and vanishing resources. -- Fraser, Dean. [1971]
301.32 POP Population and food. [Filmstrip] 1964
301.32 PRI One earth, many people; the challenge of human population growth. Pringle, Laurence P. [1971]
301.32 SAX Standing room only: the world's exploding population. -- Sax, Karl. New ed. -- [1960]
330.942085 CAN Can Britain survive? 1971
338.19 LOW World population and food supply. Lowry, J. H. 1970
632 CAR Famine on the wind; man's battle against plant disease. Carefoot, G. L. [1967]

FOOD SUPPLY. Third World countries
Foreign aid by United States

338.19 PAD Famine, 1975! America's decision: Who will survive? Paddock, William. 1967
338.191724 GEO How the other half dies : the real reasons for world hunger. George, Susan. Reprinted with revisions 1977. -- 1977
338.9 PAD Hungry nations. Paddock, William. [1964]

Appendix G: Samples from an elementary school's microfiche catalogues



ADVANCE ACCESS GROUP, INC. © 1980 □ ACCU-FICHE™ ENVELOPES □ ARCHIVAL QUALITY □ ACID-FREE □ MADE IN U.S.A.

Appendix H: Samples from the Aurora H.S. microfiche catalogues

ADVANCE ACCESS GROUP, INC. © 1980 □ ACCU-FICHE™ ENVELOPES □ ARCHIVAL QUALITY □ ACID-FREE □ MADE IN U.S.A.